AVIATION WEEK

A McGRAW-HILL PUBLICATION

MAR. 31, 1952

50 CENTS

Now the Boeing KC-97A Flying Tanker

Lowers the Boom on Icing Problems

ICEGUARD PROTECTION on ruddevator surfaces controlling refueling boom. Smaller picture shows KC-97A in flight refueling of B-50.

PLANE-TO-PLANE refueling in flight is a delicate operation, particularly the guiding of the flying boom on the tanker to the inlet on the second ship. It's accomplished with "ruddevators"—combination rudder-elevators at the end of the boom. Because the slightest amount of ice on these guiding surfaces would cause trouble, current production of the ruddevators on Boeing's KC-97A relies on Goodyear's Iceguard to prevent ice formation.

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Akron 16, Ohio or Los Angeles 54, California

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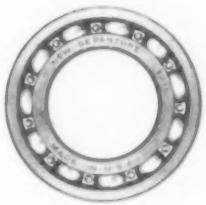

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Aviation Week

ABP Member ABC

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Robert H. Wood
EDITOR

Merlin H. Mickel ..... MANAGING EDITOR

Alexander McSurely ..... Assistant Managing Editor
Ben Lee ..... Assistant Managing Editor
G. L. Christian III ..... Military Editor
David A. Anderton ..... Equipment & Maintenance
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Henry Lefer ..... Avionics
A. W. Bentz ..... News Desk
Scott H. Reiniger ..... News Desk
Victoria Giaculli ..... Editorial Assistant
Erwin J. Bulban ..... Editorial Assistant
Leo T. Tarpey ..... Special Assignments
..... Editorial Makeup

Editorial Offices: 330 West 42nd St., New York 36, N. Y., Phone Longacre 4-3000, or (night) 4-3035; National Press Bldg., Washington 4, D. C., Phone National 3414.

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Pictured is the Chase XC-123
— prototype of the C-123

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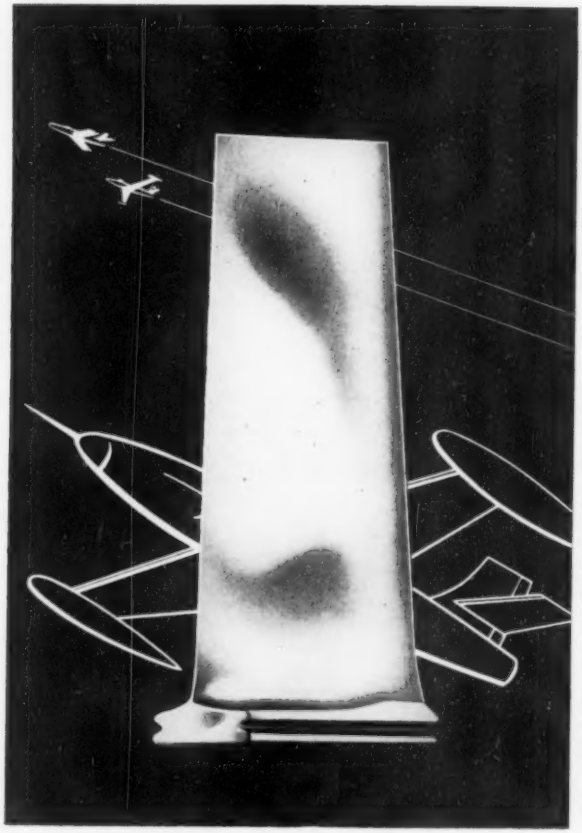

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NEWS DIGEST

DOMESTIC

Guided Missiles division has been established by Republic Aviation Corp., with offices at 99 Broadway, New York. Robert G. Melrose is general manager, James H. Brewster is director of military contracts, and Philip E. R. Brice is director of engineering.

Sikorsky S-55 helicopter has been certificated by CAA, clearing the way for civilian operational use. Los Angeles Airways has S-55s on order for its certificated scheduled passenger service.

First air delivery of USAF Republic F-84 Thunderjet fighter-bombers to a NATO nation was made Mar. 24, with three planes being flown to France via Labrador, Iceland, Greenland and Scotland without escort.

Propellers and parts shipments during 1951 totaled $100.1 million, representing a 50% increase over 1950. Military shipments accounted for 81% of the total, valued at $81.2 million.

North Atlantic certificates of PAA and TWA should be made permanent, recommends CAB Examiner Francis Brown. He adds that PanAm's service to Paris and Rome and TWA's to Frankfurt and London should run for five years only. Brown also recommends denial of European American Airlines' proposal to operate a non-subsidized trans-Atlantic airfreight shuttle service.

Loening Intercollegiate Flying Trophy has been reactivated by veteran engineer and aircraft consultant Grover Loening, to be awarded annually to leading U. S. collegiate flying club. National Aeronautic Assn. will administer the award, with first presentation scheduled for announcement at National Intercollegiate Air Meet, Stillwater, Okla., May 9-10. Last winner was University of Michigan, in 1940.

FINANCIAL

Boeing Airplane Co. reports profit after taxes of $7,140,751 for the year ended Dec. 31, 1951, on sales and other income of $337,957,026. For 1950, profit after taxes was $10,826,558 on sales and other income of $307,806,262. Backlog at the 1951 year-end was $1,355 million.

Lockheed Aircraft Corp. reports profit after taxes of $5,793,463 for the year ended Dec. 31, 1951, on sales and other income of $241,399,364. For 1950, profit after taxes was $7,209,934 on income of $174,386,259. Backlog at the 1951 year-end was $970,435,000.

Republic Aviation Corp. reports profit after taxes of $2,934,613 for the year ended Dec. 31, 1951, on sales of $130,440,552. For 1950, profit after taxes was $2,355,006 on sales of $57,713,432. Backlog at the 1951 year-end was more than $580 million.

United Air Lines' new 223,865 shares of cumulative preferred stock will have 4.5% dividend rate and each share will be convertible into 3.15 shares of common, according to a final amendment to UAL's registration statement with SEC.

Pioneer Air Lines realized a $194,078 net profit after taxes on its 1951 operations. Carrier authorized a 15-cent-per-share dividend on Mar. 31 to holders of record on Mar. 24.

Pacific Airmotive Corp., Burbank, had corporate sales of over $2,537,000 for January, a 60.5% increase over the same period last year. In 1951, total sales were $23,938,229 and net income after federal income taxes was $740,074.

Braniff International Airways reports net profit of $1,338,000 for 1951, with revenues totaling $25,356,000.

Northwest Airlines had operating revenues of $3,311,753 for February. After $394,800 adjustment for income tax accruals, net loss was $383,278.

Trans-Canada Air Lines reports 1951 was most successful year the carrier has ever had. TCA flew 930,691 passengers, nearly 2.4 million ton miles of cargo and 1.2 million ton miles of express on its North American routes during the year.

INTERNATIONAL

Republic RF-84F photo-reconnaissance version of sweptwing Thunderjet with "solid" nose and wing-inlets for Wright-built J65 Sapphire turbojet is flying.

KLM DC-6 crashed during poor weather, in a Frankfurt, Germany, suburb on Mar. 22 killing 43 of 47 aboard. Death of one survivor later brought toll to 44.

English Electric Canberra twin-jet bomber flew approximately 10,000 miles from England to Darwin, Australia, in 20 hr. 20 min. flying time, clipping three hours from a Canberra mark.

Lockheed transport crashed while taking off from Gao, French West Africa, on Mar. 24, killing 16 of 19.

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LARGEST EXCLUSIVE MANUFACTURERS OF RF INTERFERENCE FILTERS

AVIATION CALENDAR

Mar. 31—Technical Societies Council of N. J. annual conference; panels on metal working and quality control; Essex House, Newark, N. J.

Mar. 31-Apr. 1—First annual Agricultural Aviation Conference, sponsored by Texas Aeronautics Commission, Texas Flying Farmers, and the A&M College System; at A&M College of Texas, College Station.

Apr. 1-4—22d annual Greater New York Safety Convention & Exposition, Hotels Statler and New Yorker, New York.

Apr. 3—Confetence on safety problems of aviation, in conjunction with 22d annual Safety Convention of Greater New York Safety Council; Col. Gilbert E. Teal, USAF, will preside; Hotel Statler, New York.

Apr. 9-11—Society of the Plastics Industry seventh annual technical session, reinforced plastics division, Edgewater Beach Hotel, Chicago.

Apr. 13-17—American Institute of Electrical Engineers southwest district meeting, Hotel Jefferson, St. Louis; aviation papers Apr. 15-16.

Apr. 15-8—International Federation of Airline Pilots' Assns. annual convention, Sydney, Australia.

Apr. 21-24—National Aeronautic Meeting and Aircraft Engineering Display, Society of Automotive Engineers, Hotel Statler, New York.

Apr. 22—Institute of the Aeronautical Sciences meeting, Cleveland-Akron section, Cleveland.

Apr. 28—International Air Transport Assn. Warsaw Convention special committee meeting, Bermuda.

Apr. 30-May 2—American Institute of Electrical Engineers northeastern district meeting, Arlington Hotel, Binghamton, N. Y.; aviation papers Apr. 30.

May 2-4—Sixth annual Intercollegiate Air Meet, Great Barrington, Mass.

May 5-7—Symposium, "Progress in Quality Electronic Components," sponsored by Institute of Radio Engineers, American Institute of Electrical Engineers, and Radio & Television Manufacturers Assn.; technical sessions at Dept. of Interior auditorium; registration at Roger Smith Hotel, Washington, D. C.

May 11—International Air Transport Assn. traffic committee meeting, Buenos Aires.

May 12-14—National conference on airborne electronics, co-sponsored by Institute of Radio Engineers' Dayton section and Professional Group on Airborne Electronics, Dayton Biltmore Hotel, Dayton, Ohio.

May 15-16—American Helicopter Society annual forum and banquet, Hotel Washington, Washington, D. C.

May 19—International Air Transport Assn. technical committee and medical committee meeting, Copenhagen.

PICTURE CREDITS

9—(top) Mooney Aircraft; (center) Howard Levy; (lower left) USAF; (lower right) United Aircraft Corp.; 13—(Oblum) Convair; (Kaiser) Karsh; 14—North American; 31—Tony Pyeatt; 73—CAA.

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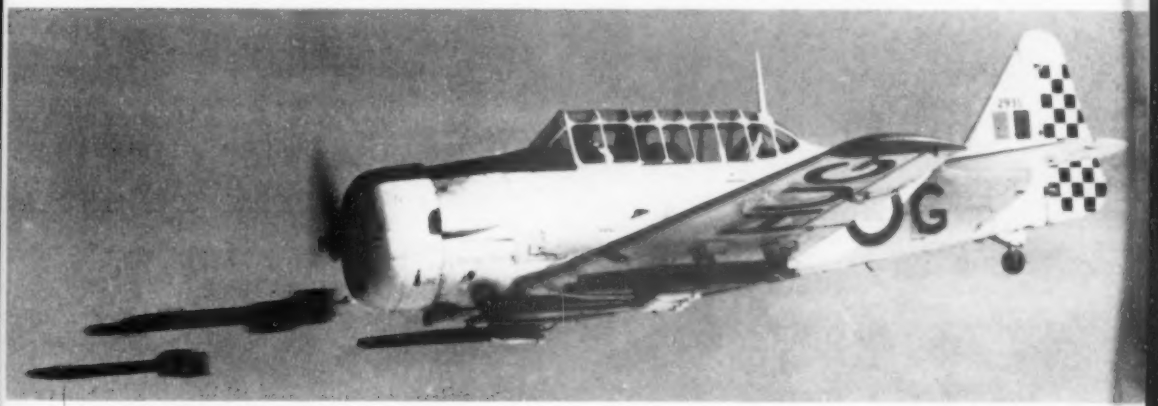
Week's News In Pictures

NEW MOONEY—Four-place Mooney 20 (right) shown in artist's sketch is expected to be delivered by late fall of this year. It marks the company's entry into the executive plane field, is designed to cruise at over 160 mph. and have a 21,000-ft. ceiling.



ROCKETS RELEASED—RCAF North American Harvard (above) fires off its load of four training rockets. The craft also carries a number of small practice bombs under the center section. Large numbers of this version of T-6 Texan are used by the Canadians.

NAVION UNDERGOES SKI TRIALS—Below is one of three Ryan Super Navion 260s tested by USAF in Canada to gather ski data and develop effective use of this equipment.

BIG COPTER DELIVERY—Thirteen big ten-place Sikorsky helicopters (below) prior to being delivered to USMC and USAF are seen assembled at the company's Bridgeport, Conn., plant.

Small and lightweight, G-E's new static-type voltage regulator is both fast and precise. Voltage regulation from no load to full load is better than ±2.5%, while recovery to ±5% of rated voltage occurs in less than 0.1 seconds after release from extreme conditions of load.

Strength and dependability are built compactly into the regulator. Operation is unaffected by aircraft pitch, roll or yaw, or accelerations of 10 g. There are no tube filaments, no fragile components, almost nothing to wear out. Operation is good to above 50,000 ft., and between −67° F and +160° F.

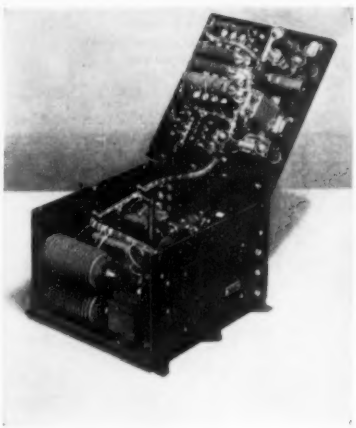
New Static Regulator for Aircraft Alternators Has No Carbon Stacks

Can withstand 10-G acceleration; Remains stable throughout life

Designed to military specification MIL-G-6099, this compact new static-type voltage regulator eliminates routine maintenance, reduces replacement costs, permits better aircraft electric system performance under extremes of altitude and temperature and eliminates exciter reversal problems. Both small and rugged, the regulator is designed to control G-E's new line of high-performance aircraft alternators.

Note these significant features:

- **Expected useful life above 5000 hours**
- **No carbon stacks**
- **Ready to operate—no warm-up required**
- **Can be used with alternators either wye- or delta-connected**
- **Negligible voltage drift with temperature**



In G-E's new lines of alternators and voltage regulators the advantages of light weight, compactness and reliability of a-c electric systems are available for your aircraft installations. But whether your problem is a-c or d-c, a single instrument or complete electrical system, contact your General Electric aviation specialist, or write the General Electric Co., Schenectady 5, N. Y.

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210-32

WHO'S WHERE

In the Front Office

Robert F. Six has been renamed president of Continental Air Lines for the 14th consecutive year and **Joseph A. Uhl**, formerly vice president & secretary-treasurer has been designated vice president-treasurer.

Changes

William H. Gibbons has been appointed advertising manager of Tinnerman Products, Cleveland.

Edward H. Jefferson has been named resident director of Hawker Aircraft (Blackpool) Ltd.

Robert L. Showler has been made sales manager of Colonial Airlines.

Mark E. Martin has been designated superintendent of territorial airports and operations by the Hawaii Aeronautics Commission, succeeding **C. L. Gillette**, who resigned effective Apr. 19 to enter the automobile business.

D. P. Thurber has been named chief pilot for Philippine Air Lines' international division. Thurber will be in charge of the carrier's expanded DC-6 and DC-6B training program.

Charles W. Tierney has been designated general sales manager for Resort Airlines.

Bob Van Deventer has joined the Aircraft division of General Controls Co., Glendale, Calif., as an aircraft factory sales manager.

Frank L. Argall, formerly director of training for Cal-Aero Technical Institute, has been appointed plant manager of Grand Central Aircraft Co. for its Glendale facility. Succeeding Argall at Cal-Aero is **J. D. Strickland**, who retains his post as school registrar.

Alexander Pechman has joined development laboratories of Ryan Aeronautical Co., San Diego, as staff engineer. He came from Cook Ceramic Mfg. Co., Trenton, N. J.

What They're Doing

Stuart D. King, formerly of Cowlesville Mfg. Co., has joined **Harry C. Kline, Jr.**, in formation of H. C. Kline Associates, which specializes in making windtunnel and other aircraft scale models. The firm is located at 42 Virginia Place, Buffalo, N. Y.

Stephane P. Thouvenot is resigning as Deputy Director General of the International Air Transport Assn., effective Apr. 15, for private and family reasons. He is returning to Paris. Thouvenot was appointed to IATA in December, 1950.

Honors and Elections

John Jay Ide has been presented a special gold medal by the National Advisory Committee for Aeronautics in recognition of his having served "faithfully and with distinction" as NACA's representative in Europe from 1921-1950.

Dr. Edward H. Lambert of the Mayo Foundation, has been awarded the first annual Arnold D. Tuttle award by the Aero Medical Assn. for research in aviation medicine. He was particularly cited for his work in acceleration research and in the perfection of "blackout suits" for military personnel.

INDUSTRY OBSERVER

► Interesting Anglo-American turbojet rivalry is going on between the axial flow Armstrong Siddeley Sapphire which Curtiss-Wright builds as the J65, and the centrifugal flow Pratt & Whitney J48 which started life as a Rolls-Royce design called the Tay. Navy's recent announcement that the J48-P-8 was ready for flight testing was coupled with unofficial indications that this model has a thrust rating of around 7,200 lb., or about 1,000 lb. more than earlier J48s. It goes into the new sweptwing Navy Grumman Cougar F9F-6. The ink hardly was dry on the Navy press release before Armstrong Siddeley was proclaiming that a new version of the Sapphire had boosted its thrust from 7,200 lb. to 7,500 lb. in a 150-hr. type test at the higher power.

► **Unofficial record for sustained flight in a jet fighter was believed set recently by a Republic F-84G Thunderjet when it flew for 12 hr. 5 min. with four aerial refuellings from a Boeing KB-29P tanker. Fighter pilot, Lt. Walter G. Hodges, (31st. Fighter Escort Wing) lost three pounds in flight but otherwise was in good condition at the landing at Edwards AFB, Calif.**

► Evidence of how much USAF attention was paid to the clamor for more contracts in the Detroit area to satisfy the labor vote appears in recent revisions of military plane schedules. Kaiser-Frazer didn't get any more plane orders for Willow Run, but at least they kept the total number of C-119s the same, while other plane manufacturers, including Fairchild, the original builder of the C-119, took a sharp trimming. This confirms an AVIATION WEEK forecast (Jan. 21, p. 14) that the K-F airframe program would be saved from the general pushback. Specifically, the Willow Run contract for 158 USAF C-119Fs remains unchanged. The rest of the Willow Run C-119 production is 21 C-119Fs, 18 for MDAP and 3 for RCAF. The older schedule called for 21 C-119Gs, all for MDAP.

► **Lockheed reports it has spent nearly half a million dollars in company funds in the last two years in developing its new jet transport design, including a series of wing tests in the Cal Tech high speed windtunnel and other aerodynamic and structural studies to reduce weight and increase cruising speed of the plane for which it still has no airline orders.**

► Virtually the only difference between North American's F-86E jet fighter which was to phaseout this month, and the F-86-F, which replaces it, is in the later and more powerful J47-GE-27 engine which goes into the F, instead of the J47-GE-13 which powers the earlier plane. With the phaseout of the F-86E, North American will be making the F-86D radar-equipped rocket-armed interceptor, and the F-86F air superiority fighter at the Los Angeles Airport plant. At North American's Columbus plant will be made parallel lines of F-86Fs for the Air Force and the Navy FJ2 which is a carrier fighter adapted from the F86F.

► **Piasecki's first H-21 Air Force rescue helicopter is due to take the air for the first time at the Morton, Pa. plant later this week. The H-21 is powered by a 1,150 hp. Wright R-1820-103 and grosses more than 13,000 lb.**

► Air transport mobilization plans were presented to 150 airline presidents and other officials last week at a meeting with AF Secretary Finletter, MATS Commander Maj. Gen. Joseph Smith, and Defense Air Transportation Administrator Ray Ireland. Gen. Smith outlined the program generally as calling for an airline reserve fleet of 362 four-engine planes, of which 331 would be available in 48 hours. A first-line reserve of 91 planes would operate regular airlift schedules throughout the mobilization; the second-line reserve of 240 would fly only during peak load requirements of MATS. During the first month of reserve fleet operation, the reserve fleet would increase from 331 to 362 as light-cargo DC-4s were modified to heavy-cargo specifications to replace 15 light-cargo DC-6s and 33 light-cargo DC-4s.

Washington Roundup

Lovett vs. Finletter

Breach between Secretary of Defense Robert Lovett and Secretary for Air Thomas Finletter is closing.

The basic issue between the two:

• **Finletter,** like Gen. Curtis LeMay, whom he sponsored for appointment as Air Force Chief of Staff, wants overriding emphasis on strategic air.

• **Lovett,** though, as top man at Defense Department, has responsibility for tailoring defense policy to foreign policy. This requires a defense force to "hold" Europe and vast areas around the globe. It involves substantial ground forces supported by tactical air and naval forces to control the sea for logistic support—as well as offensive strategic air.

Army, Navy and tactical USAF men—as well as State Department—are with Lovett.

• Finletter has the President's personal support. Lovett, though a member of the Truman family in 1948 as Assistant Secretary of State, favored Gov. Thomas Dewey's election—a fact well-remembered in Democratic political circles. His appointment as Secretary of Defense is credited to the recommendation of Gen. Marshall.

• But policy-wise Lovett and the President see eye to eye. After some behind the scenes bucking, Finletter is falling in line. That's why the Lovett-Finletter breach won't reach a showdown—at present outlook.

People

▶ **Arleigh Burke**—The Naval captain who as policyman on the staff of the Chief of Naval Operations directed "Op. 23"—the publicity campaign against the Air Force that culminated in the famed B-36 investigation—is back in that job after service in the Far East. And the Senate recently confirmed him as permanent rear admiral.

Return of Burke to Navy's "inner circle" and the fact that recognition for meritorious active service wasn't withheld from him is one factor that has revitalized the spirit of Navy airmen from the defeatism that followed their lost offensive against the B-36.

▶ **Steve Leo**—The top Air Force public relations man who maneuvered USAF's successful defense against Navy attack on intercontinental bombing and promoted USAF into recognition as "the first line of offense and defense" is now under congressional investigation.

Tennessee's Rep. Albert Gore, following a preliminary investigation by Appropriations Committee, of which he is a member, describes the Leo case this way:

• "A few days" after leaving Air Force, Leo became a stockholder and officer of Sverdrup & Parcel, a Missouri corporation in the home state of his former boss, ex-Secretary for Air Stuart Symington. The company had received approximately $10 million in USAF contracts "for doing paper work."

• Sverdrup & Parcel was then "further favored," and, "contrary to the recommendation of the Research and Development Board," given "the privilege of organizing ARO (a subsidiary corporation) to operate facilities at the Tullahoma Air Engineering Development Center," Gore said.

• "Leo gets $20,000 a year from ARO, plus a percentage" of fees.

• ARO induced Maj. Gen. Thomas Farrell to leave his $17,500-a-year vital post with Atomic Energy Commission for a $30,000-a-year salary.

• "After all their officials are paid their salaries, ARO is receiving a fee this year of $95,000—and what's more they expect twice that much next year."

Commented Gore in a House speech: "The more we have learned about ARO, the more determined we have become to seek the answers to some perplexing questions."

▶ **Stuart Symington**—The former Air Force Secretary and former chairman of Research and Development Board is definitely seeking Democratic nomination for the Senate from Missouri.

▶ **K. B. Wolfe**—House Investigating Committee under Rep. Porter Hardy is looking into renegotiation exemptions of Oerlikon Machine Tool Works—whose American subsidiary the former lieutenant general in charge of Air Force procurement now heads.

When the 1951 renegotiation law was up in Congress, an attempt was made by the Hardy committeemen and others to strike out a proviso giving permissive authority to exempt contracts from renegotiation. They didn't succeed.

But Renegotiation Board has been sparing with individual exemptions:

• Only $30.1 million in contracts have been exempted.

• Of this amount $27.7 million was for Oerlikon—all granted after Wolfe joined the firm. Five of Oerlikon's seven exemptions are USAF contracts.

Renegotiation Board's Chairman John Koehler explained to the Hardy Committee on the Oerlikon exemptions: "It has flatly refused to have anything to do with a U.S. government contract containing a renegotiation article."

Hardy Committeemen, however, don't like the idea of special treatment to special companies—for any reason.

Commented Committee Member Rep. George Meader: "In these days of widespread favoritism and influence, it is a healthy thing that contractors seeking special treatment on renegotiation know that our committee is watching them."

Beside Oerlikon, only two minor contracts have been individually exempted from renegotiation.

▶ **Col. Roscoe Turner**—A House Armed Services Subcommittee has voted a resolution sponsored by Rep. Carl Hinshaw authorizing the President to award the World War I flyer the Distinguished Flying Cross.

War on CAA

Nevada's Sen. Pat McCarran has declared war on Civil Aeronautics Administration—for maladministration.

He'll take up the case when CAA men come before the Appropriations Subcommittee on Commerce Department, which he heads, for coming-year funds—unless, in the meantime, CAA Administrator Charles Horne appeases the Senator into a declaration of peace.

This is the comment for the record of the two key Senators on CAA and CAB matters when questioned as to their view on the management of the two agencies:

• McCarran: "CAB is now doing a good job. I am certainly not boasting about CAA under Mr. Horne."

• Sen. Edwin Johnson, chairman of the Senate Interstate and Foreign Commerce Committee: "CAB is now doing an excellent job. That's all I have to say." Johnson's Committee staff is now looking into the administration of CAA's Office of Aviation Safety.

—Katherine Johnsen

AVIATION WEEK VOL. 56, NO. 13 MARCH 31, 1952

EDGAR KAISER: Debt relief will give . . .

FLOYD ODLUM tax benefits for Atlas.

New Merger Facts Disclosed

- **Wedding of Convair and Kaiser-Frazer would give Odlum and Kaisers a huge aviation empire.**
- **And Convair would have access to K-F facilities if Ft. Worth plant is turned to B-52 production.**

By Ben S. Lee

Proposed merger of Consolidated Vultee Aircraft Corp., The Atlas Corp. and Kaiser-Frazer Corp. has gone far beyond the "exploratory stages" admitted by interested officials.

Exclusive details learned by AVIATION WEEK indicate the merger may be firmed up within 60 days under present plans. It would combine these companies into one of the most dominant aircraft organizations in the world. Indications are that The Atlas Corp., a holding company, will be top stakeholder in the deal.

Marriage of the two industrial giants—a major aircraft company and large automobile manufacturer—means for Floyd B. Odlum, chairman of Convair and president of Atlas Corp., realization of a long-standing financial dream of creating a General Motors Corp. in aviation.

For the father and son team of Henry J. and Edgar F. Kaiser it places them squarely in the aircraft industry big time and, most important, it means ultimate relief from a $53.8-million K-F debt to RFC.

For the major aircraft independents, Lockheed, Douglas, Boeing, Fairchild and others, it means a new major competitive threat.

▶ **Admit Merger Talk**—Few details of the merger plan were admitted last week. A joint statement by Odlum and Edgar Kaiser released in Oakland, Calif. said only that "exploratory discussions concerning possible merger of the Atlas Corp., Consolidated Vultee Aircraft Corp., and Kaiser-Frazer Corp., are under way."

The move will probably see Henry and Edgar Kaiser named to directorship of the Atlas Corp. Identity of the Kaiser-Frazer Corp. will be retained with Edgar Kaiser continuing as president.

The merger will also result in appointment of Odlum to the Kaiser-Frazer board chairmanship. Kaiser-Frazer capital debt to RFC, $53.8 million, will be assumed by Atlas Corp. Atlas will be able to write off the large debt through federal tax loss carryover for three years.

From Atlas-Odlum viewpoint, what are particularly attractive are the large manufacturing plant and mass production facilities of Kaiser-Frazer. The Fort Worth plant operated by Convair, although one of the largest in the nation, is wholly owned by the Air Force. Willow Run, on the other hand, is privately owned by Kaiser-Frazer, although USAF does retain a recapture clause to the plant.

▶ **Bomber Outlook**—Non-computable factor at this time but of vital concern to the Consolidated Vultee future at Fort Worth is USAF's strategic bomber program. As presently programmed by the Air Force, production of the giant B-36 will phase out in August of 1954. Phasing-in at the same time will be either the Boeing eight-J57-engine sweptwing B-52 bomber or Convair's design progression from B-36 to sweptwing eight-J57 engine B-60.

According to former USAF Undersecretary John A. McCone, the Boeing B-52 is to be mass-produced in the Ft. Worth-USAF plant now occupied by Convair. Strategic bomber production of either B-52 or B-60, however, Air Force insists, remains to be determined "solely on either plane's merits and performance."

Decision on the part of USAF in favor of the B-52 could leave Convair without a major production plant in which to build a big plane if the Ft. Worth facility should go to Boeing. And several projects under development by Consolidated Vultee will require very large production facilities. Among others, these include the atomic engine bombers, large transports, etc.

Both Henry and Edgar Kaiser have long been advocates of air power. Both have particularly been interested in commercial transport as well as in military aircraft production. Merger of Consolidated Vultee and Kaiser-Frazer will give the twin company an aircraft industry production potential that appears awesome to the major independents.

▶ **Other K-F Plants**—The Kaiser-Frazer corporation, besides the giant Willow Run facility, includes: Detroit Engine Div., which produces automobile engines and Wright R-1300 piston engines; Dowagiac, Michigan, plant producing components for the R-1300; Shadyside, Ohio, stamping plant (near Wheeling, W. Va.) presently making forge-press auto components but scheduled for aircraft components manufacturing; San Leandro, Calif., plant manufacturing airframe components for Lockheed P2V patrol bombers; Richmond, Calif., shipyards machining aluminum forgings for 90 B-52A structural airframe components; and Chase Aircraft Co., Trenton, N. J., now en-

gaged in engineering the C-123 assault transport.

In addition to the hat Edgar Kaiser wears as president of the Kaiser-Frazer Automobile Corp., he is also president of Chase Aircraft, scheduled next year to begin production of the C-123 assault transport. At present Kaiser-Frazer is beginning buildup in production of Fairchild C-119 transports, mostly for the USAF, although several are for mutual defense assistance and a few will go to the Royal Canadian Air Force.

Kaiser will produce approximately 55 C-123 assault transports for the Air Force at Willow Run and eventually, along with the other Kaiser-Frazer divisions, will probably produce for the combined Kaiser-Odlum organization. This would bring Chase to major aircraft company status, which will then impose a serious competitive threat to the Fairchild Engine and Airplane Co.'s Aircraft division and its C-119.

▶ **Financial Aspects**—Merger of Kaiser-Convair-Atlas corporations is viewed in financial circles and government circles in Washington with mingled feelings because of the effect it will have on financial aspects of aircraft finance throughout the nation (particularly on Wall St.) as well as on the industry itself.

One top Air Force official said that, while he could see the Odlum-Kaiser advantages in such a merger, he did feel that it could possibly have a demoralizing effect on the spirit of competition that now exists throughout the industry. That competition, he declared, is what has made U. S. aviation great.

Another top Air Force official took a more favorable view of the merger program. Although the Air Force is officially not aware of the proposed merger and will have to examine its merits because of its Ft. Worth and Willow Run interests, he thought it basically sound and a good idea.

A top Navy air official said that Navy had not been officially informed of the pending merger and therefore would be unable to comment upon its feasibility. Unofficially, however, he pointed out that the increasing complexity of aircraft manufacture "systemwise" could make it extremely advantageous for either Air Force or Navy when considered from point of aircraft unit economy.

▶ **New Avenues**—A former top Air Force officer took a similar view and also pointed out that such a combined organization could, if it desired, circumvent usual government research and development red tape and produce a completely privately financed and engineered design. While such an application by the merged group at this time is conjectural, he said, it does open up entirely new avenues in the military aircraft development and production picture.

Informed private financial circles and government officials in Washington agreed that with the Kaiser industry resources and progressive drive plus the financial capabilities of the Atlas Corp., the new organization will have a tremendous impact upon the entire aircraft industry and certainly would spell its coming of age.

Legal aspects of the proposed merger are exceedingly complex. But lawyers of all three participants, so far, have concluded that the merger will in no way violate provisions of the Sherman anti-trust laws.

▶ **Precedents**—Robert Gross of Lockheed, back in the bleak days following World War II when the aircraft industry was withering rapidly, came up with three separate merger proposals to insure perpetuation of Lockheed. Two, somewhat similar to the proposed Kaiser-Odlum program, were denied by the Justice Department, and a third was canceled because of a brightening aircraft production picture.

The first of the Gross proposals asked for merger of Consolidated Vultee, Lockheed and Curtiss-Wright. This was felt by Justice Department to be in violation of the Sherman law, as was a second Gross proposal to merge Lockheed and Convair. A third proposal which would have merged Lockheed and Curtiss-Wright finally obtained Justice Department blessing. But, just as the legal interpretation which would have permitted the merger was accomplished, Lockheed dropped the project as did Curtiss-Wright because of their respective boards' disinterest.

Another merger which was proposed about this same time by Atlas Corp. would have joined Consolidated Vultee and Curtiss-Wright. This final plan was voted down by directors and stockholders of C-W, which at the time still was an aircraft manufacturer.

▶ **Provided Framework**—Actually, it was the preliminary legal spadework done by Lockheed, Curtiss-Wright and Justice Department that has provided the framework within which the Kaiser-Convair-Atlas merger will develop.

Total assets of the Consolidated Vultee Aircraft Corp., reported as of November, 1951, were $99 million. Its current projects include the B-36 intercontinental bomber, Navy R5Y flying boats, and projected delivery of the Air Force F-102 delta-wing fighter and Navy F2Y interceptor. The company also has considerable military contracts for the production of guided missiles and related devices.

Atlas Corp. is an investment corporation, headed by Floyd Odlum, which had total assets of some $74 million as of Dec. 30, 1951. Approximately $7.5 million of these funds comprise ownership of 430,300 shares of Consolidated Vultee stock. The Atlas Corp. holds also the controlling interest in Atlantic Refining Co., Sunray Oil Corp., Northeast Airlines, United Fruit Co., as well as considerable holdings in several other major U. S. industries.

Truman Letter

- **Senator says it does not deny influence on CAB.**
- **But President says he's opposed to pressure.**

President Truman's reply to a senator's criticism of influence by White House aides on Civil Aeronautics Board actions has been published, but the senator says it was not a denial that there was such influence.

Chairman Edwin Johnson of the Senate Interstate and Foreign Commerce Committee wrote the President shortly after the 1948 election. Rumor had hinted at politics in the award of a Seattle-Honolulu route to Pan American World Airways, and John-

NAA'S NEW PRODUCTION TEST HANGARS

These two modern 100 x 200-ft. hangars with their eyecatching overhangs providing protection against inclement weather are a new feature at Los Angeles International Airport, where they are used by North American Aviation to install and production flight-test F-86D Sabre electronic and related equipment. The F-86D all-weather fighter carries considerable radar gear used for interception of enemy aircraft.

son's letter objected to White House influence on CAB.

The President's reply, dated Feb. 18, 1949, appeared in the recent book by William Hillman, entitled "Mr. President"—a book that currently is top talk in Washington political circles.

▶ **No Denial**—Johnson's comment to AVIATION WEEK after the book appeared: "The President's reply did not deny the objection I obviously raised." Here is that reply, as printed in the book:

"I read your letter of the fourteenth with some surprise. It is not the habit of people in my immediate office to make any suggestions to quasi-judicial boards. You know the Congress creates the board—the President appoints them and they have specific duties by law. They are supposed to be made up of men of integrity who weigh facts and they should not be importuned individually to do special favors.

"My only appearances before these boards while I was in the Senate were public appearances, usually at the request of the boards to express my opinion. I remember three specific instances in which I appeared before boards of this sort.

"I once appeared before the Interstate Commerce Commission and made a statement of my views on the sale of railroad securities. It is a matter of record. I didn't discuss my views with any single member of the Interstate Commerce Commission but stated them in public before the whole commission.

"I made a similar appearance before the Securities and Exchange Commission to discuss the same question and I appeared before the Communications Commission to discuss what I thought was the proper way of handling applications for radio stations. All these were public appearances and are of record.

"Never in my ten years in the Senate did I ever lobby with any commission for a special interest in my own state or any other state. I think it is bad policy for Senators and Representatives or representatives of the President to lobby with these commissions and boards. I have no intention of bringing pressure to bear on any one of these commissions for any purpose whatever. If the people on the boards and commissions, appointed by the President and confirmed by the Senate, are not men enough and ethical enough to transact the business of the government they ought not to be on the boards. It is their business to find the facts and make the decisions.

"I have had to reorganize the Civil Aeronautics Board because of so many special interests lobbying with them and those special interests work from every angle."

RAF Outlook

- **Fighter units will get Britain's top billing.**
- **And 'super priorities' do not support bombers.**

(McGraw-Hill World News)

London—The Royal Air Force got another airing in Commons this month as the M.P.'s debated this year's air estimates. Spending on the RAF this year is to top $1.3-billion, 42% more than last year.

George Ward, named by the Tory government as Undersecretary of State for Air only a fortnight ago, again sounded the danger signal: "The expansion of the RAF is underway. But today it is still far from adequate either to defend our country or to play its part in the defense of Europe and our Atlantic lifeline." At one time since the war, Ward pointed out, the front-line strength of the RAF sank to a little over 1,000 aircraft.

▶ **Spelling It Out**—Echoing Prime Minister Churchill, Ward said "super-priority" was now going to the Hawker P. 1067—officially named the Hunter—and the Vickers Supermarine Swift jet fighters. This week the Ministry of Supply was spelling out this priority in terms of specific allocations of manpower and materials.

But, Ward said, "We are at present carrying out our expansion with the latest version of existing types of aircraft." It still looks like 1954 before any quantities of Swifts and Hunters will be in service. (A second mark of the P. 1067 with more sweep to its wing will be the ultimate service type of this aircraft.)

Ward felt that the day fighters now flying with the RAF were capable of intercepting and shooting down any type of enemy bomber likely to attack England for some time to come. The deficiency came in fighter vs. fighter battles. For that the British were duly grateful to Canadian and U. S. Sabre squadrons now based in England.

Progress was good in re-equipping Fighter Command with night fighters—the Armstrong Whitworth N.F. 11 now and the de Havilland Venom II later this year. All night fighter squadrons now have jets, whereas a year ago all of them still had the aging Mosquitoes.

Ward dropped few hints about the future of Bomber Command other than to restate the fact that "We cannot have a bomber force of the size we had in the last war. The cost would be prohibitive." Instead, the RAF's aim is to achieve striking power with fewer aircraft by increasing the bomb load, by greater accuracy and by the use of more effective weapons.

▶ **Greater Accuracy**—"I would particularly like to lay stress on the importance of accuracy," Ward said. "We are developing new navigational and bomb-aiming devices, which are doubly necessary owing to the increased height and speed at which modern bombers fly." Behind this modest statement lies a wealth of British development, some of which may be made public when the new Avro delta-wing bomber flies for the first time later this year. Two Canberras, equipped with newest bomb-sights are in Australia now for atomic tests on the Woomera rocket range.

The orphans of the RAF—Transport Command and Coastal Command—got little or no encouragement from Ward's statement. "We fully recognize that the expansion of Transport Command is something that is highly desirable," Ward said, "but, regretfully, we see no means of expanding it beyond its present size while the expansion of other operational commands is in progress."

This pretty well rules out any hopes that Transport Command will get the Blackburn & General GAL.60 freighter which it wants.

Equipment—not aircraft—was all Ward could promise Coastal Command, now flying Avro Shackletons and Lockheed Neptunes. Ward thought that "with present equipment, our Coastal Command aircraft are likely to be less effective than they were in the last war." (The British have expressed some disappointment in the Neptune; they claim its single engine performance at low altitudes leaves much to be desired.

▶ **Remedy**—To remedy the situation, Ward spoke of "new types of torpedoes, asdic equipment, sono-buoys, and other more subtle means of detecting submerged submarines" which are being developed.

Ward indicated that the RAF's 2nd Tactical Air Force in Germany would get both Venom II night fighters and Venom I (single seat) fighter bombers this year. Most of the forthcoming Sabres from Canadair, Ltd. also will fly in Germany "to form a strong top-cover force." The Sabres, whose engines will be supplied from the U. S., aren't likely to be delivered in England before the spring of 1953.

Ward gave the Commons only the barest peek at the guided missile program which is employing a good share of top aviation brains here. He indicated that several types are being tested on Australia's Woomera rocket range including air to air, ground to air, air to ground, and ground to ground missiles.

Put Your Scrap Back to Work

Executive Salaries Listed by 5 Lines

Two trunkline carriers and three local service airlines have reported 1951 salaries, bonuses and stock holdings for their top executives and directors as shown in the following list. Corresponding figures for 1950 are given in parentheses.

▶ **Braniff Airways, Inc.**—T. E. Braniff, president, salary $30,000, bonus $3,369, stock on record, 275,224 common shares ($30,000, $3,369, and 278,224 common shares); C. E. Beard, executive vice president, salary $27,000, bonus $2,190, stock on record, 100 common shares ($24,250, $1,983, and 100 common); R. C. Schrader, vice president, $19,000, bonus $1,992, and 1,200 common, ($17,625, $1,888, and 1,200 common); C. G. Adams, secretary-treasurer, $19,000, bonus $1,728, and 1,900 common shares ($17,625, $1,624, and 1,900 common shares); John B. Walker, vice president, $8,833, no bonus, and no stock ($23,041, no bonus, and 200 common shares); O. W. Crane, assistant treasurer, $9,450, bonus $701, and 100 common shares ($8,475, $628, and 350 common shares); R. L. Barrier, assistant secretary, $7,905, bonus $482, and no stock, ($7,250, $432, and no stock).

Also the following directors: Hal C. Thurman, salary $15,000, bonus $666, and 2,321 common shares ($15,000, $999, and 2,321 common shares); Ferdinand Eberstadt, no salary, bonus $250, and 100 common shares (no salary, $500, and 100 common shares); Roger J. Whitford, no salary, bonus $250, and 150 common shares (no salary, $250, and 150 common shares); Fred Jones, no salary, bonus $250, and 1,000 common shares (no salary, $750, and 1,000 common shares); and George Butler, no salary, bonus $500, and 5,000 common shares (no salary, $750 and 5,000 common shares).

▶ **Pioneer Air Lines, Inc.**—Robert J. Smith, president and director, salary $12,500, no bonus, 26,818 common shares $18,125, no bonus, 26,818 common shares); Harold B. Seifert, vice president and director, $11,460, no bonus, 264 common shares ($10,896, no bonus, 264 common shares); Harding L. Lawrence, vice president and director, $10,200, no bonus, 215 common shares ($9,000, no bonus, 15 common shares); Eugene W. Bailey, secretary-treasurer and director, $10,800, no bonus, 1,078 common shares ($9,600, no bonus, 956 common shares).

Also the following directors: W. F. Long, chairman of the board, salary $5,000, no bonus, 27,716 common shares ($5,000, no bonus, 27,291 common shares); J. Wesley Hickman, 455 common shares (545 common shares); Raymond Pearson, 1,500 common shares ($1,500 common shares); Charles B. White, no stock (499 common shares); Shelby Kritser, no stock (none); Price Campbell, 1,000 common shares (none); and Gene Howe, 100 common shares (100 common shares).

▶ **Midwest Airlines, Inc.**—F. L. Hoyde, president, no salary, bonus $25, no stock; Grove Webster, vice president and general manager, salary $542, no bonus, no stock; F. C. Anderson, assistant general manager, salary $9,150, no bonus, no stock (salary $8,400, no bonus, 246 common shares); R. B. Stewart, secretary-treasurer, bonus, $150; and C. J. Lynn, director, $25. (Note: Only officer serving this year who was officer or director of the company last year is F. C. Anderson.)

▶ **Empire Air Lines, Inc.**—T. T. Robinson, chairman of the board, salary $4,800, no bonus, 608 common shares (salary $4,800, no bonus, 500 common shares); Joe Lux, president, no salary, no bonus, 708 common shares (no salary, no bonus, 708 common shares); Gwin Hicks, vice president, salary $7,200, no bonus, 176 common shares (not listed as officer in 1950 reports); Frederick J. Orr, vice president, no salary, no bonus, 100 common shares (100 common shares); Arvid Nelson, secretary-treasurer, salary $3,600, no bonus, 10 common shares ($3,600, no bonus, 10 common shares).

▶ **E. W. Wiggins Airways, Inc.**—Joseph Garside, president, salary $8,000, no bonus, 4,417 common shares (salary $6,400, no bonus, 4,417 common shares); Harold E. Shaw, executive vice president and treasurer, salary $7,800, and 1,680 common shares ($7,800 and 1,680 common shares); Elmer W. Wiggins, vice president, salary $6,500 and 3,080 common shares (no salary, 3,080 common shares); Frederick S. Tobey, clerk, salary $6,000, and 651 common shares (salary $5,148 and 651 common shares); Harold E. Martin, assistant treasurer, salary $4,680 and 350 common shares (salary $4,680 and no stock); Sven G. Stenberg, assistant treasurer, salary $4,680 and 77 common shares (salary $4,680 and 77 common shares); and John Guest, director, 700 common shares (700 common shares).

Newark Airport Open For Limited AF Use

The Port of New York Authority has agreed to let the Air Force re-open Newark Airport, but only for a special Air Force use. The mayor of Newark last week sought public approval of such a limited operation.

The Air Force plan, submitted by Asst. Secretary F. V. Huggins, calls for daylight, VFR flights of planes into Newark for dismantling and shipment to Europe. Huggins promised that the Air Force would not use such a permit as an open wedge for re-introduction of airline operation at Newark.

Meanwhile, E. V. Rickenbacker, chairman of the airlines' National Air Transport Coordination Committee, has won moral support from government bodies to start a limited airline operation at Newark in April. The Interstate Commerce Committees of both House and Senate are reported to have implied that they approve the Rickenbacker plan. CAA Administrator Charles Horne also supports re-opening.

Avco Gives USAF First R-1820

First 1,575-hp. Wright-designed R-1820 Cyclone to be built by the Bridgeport-Lycoming division of Avco Mfg. Corp., has been delivered to the U. S. Air Force a little over a year after Avco took over the vacant former Chance Vought factory.

Avco completely renovated the 1.5-million sq. ft. facility after it took over on Mar. 12, 1951 and installed machine tools, materials handling facilities, cafeteria and other services. A special electrical system for heavy-duty production machine tools was put in.

Bridgeport-Lycoming for several months has been producing quantities of major components for General Electric's J47 turbojet.

Two New Copters

A new roundup list of helicopter types just issued by the Helicopter Council of Aircraft Industries Assn. shows two new commercial models—Bell's Model 61, commercial counterpart of the tandem Bell Navy XHSL-1 anti-submarine copter and Sikorsky's S-56, commercial version of Navy's HR2S-1 twin-engine tandem.

SPEEDY TAXI SERVICE

B-47 Stratojet stabilizer-elevator assembly, built by Cessna Aircraft Co.'s Wichita plant is seen en route to the Boeing-Wichita factory across the field. The little Clark tractor carries a radio and is under supervision of the airport control tower during the transfer.

CAA Views Heard at N. J. Probe

General counsel and Region I officials reveal agency policies at state hearing on three accidents.

The Chief of the Civil Aeronautics Administration's Aviation Safety Division in Region I—the nation's busiest—believes engine analyzers and Rato would not contribute to safety.

He has implicit faith in the reliability of airline maintenance.

The General Counsel of CAA in Washington believes in the once-popular CAA philosophy that the people sometimes must be protected from themselves.

He believes that no one in CAA objects to being transferred from one job to another "for the good of the service."

▶**More May Come**—These and other revealing glimpses of CAA opinions were exposed in an investigation of aircraft accidents by a New Jersey state legislative committee whose hearings attracted very little national attention.

The New Jersey legislative committee of three members of the Senate and three of the Assembly was established following the third crash in Elizabeth, Feb. 11. Its objective was to try to determine the causes of the accidents, propose state legislation for aviation safety, and to recommend action, where shown necessary, to the New Jersey Congressional delegation. With the hearings now concluded, some of the facts on CAA safety operations may be called to Congressional attention.

▶**Bobbskill**—CAA's first witness in the hearings was Stanley W. Bobbskill, Region I attorney, who appeared briefly at an evening session in Elizabeth. He barely had time to explain the organizational structure of Region I before the hearing was adjourned to a later date.

He declared that CAA has 2,500 employes in Region I, 300 of them in regional headquarters at New York International Airport. In response to a question, he stated that CAA safety agents at Newark Airport and elsewhere work a straight eight-hour day. They were on the field normally only from 8:30 a.m. until 5:00 p.m., a point that recurred and assumed significance at a later hearing.

One evening nearly two weeks later, the investigation reconvened in the Statehouse at Trenton. Until late at night a hand-picked CAA delegation had its say. Bobbskill did not return to the stand.

Prior to this hearing, committee co-chairman Assemblyman Samuel Saiber notified CAA to send a representative, but he was advised there were too many other matters requiring the attention of CAA personnel. The day before the hearing he telephoned Administrator Charles Horne and insisted that CAA's presence was required. Saiber understood that Horne himself would appear.

The next night, the spotlights in the ceiling of the mahogany-furnished Senate chamber of the Statehouse beamed down on an imposing array of CAA talent. There was Richard E. Elwell, CAA general counsel, from Washington; William LaRue, chief, Airways Operations, Region I; E. C. Marsh, chief, Aviation Safety Division, Region I, and W. E. Cullinan, chief, Airports Division, Region I.

▶**Fluet**—Their appearance was like the third, climactic act of a tense drama. The story line had begun to unfold earlier during the testimony of Joseph O. Fluet, CAB's chief investigator in Region I.

Saiber asked Fluet if it were true that testimony to be given by CAA agents at a CAB accident hearing was rehearsed before the investigators took the stand.

Fluet's face flushed as he replied sharply that any rumors of such conduct were false and a reflection upon the integrity of CAB and CAA personnel. "I have seen no lack of integrity in CAA agents," he said.

Saiber then cited the long safety record at Newark Airport and recalled that for many years of that period a W. W. McConnell was chief of CAA's Safety Operations division in Region I. He asked why McConnell was transferred to a less important post in Denver in February and what are the qualifications of his successor.

Fluet answered that that was a CAA matter and as CAA representatives were in the room they were better qualified to answer.

▶**Elwell & Co.**—The four CAA representatives were sworn in together to testify under oath. A tape recorder (also used for Fluet) was turned on to pick up their testimony because, Elwell said, his superiors at CAA wanted an actual record of the testimony. Down front, under the dais on which the committee sat, two stenographers took down the proceedings for a transcript which is available to the public.

Before any questions could be asked of him, Elwell said that from listening to the evening's testimony he believed the questions were based on an erroneous understanding that he would like to correct. Sen. Kenneth C. Hand, co-chairman of the committee, requested that Elwell delay his statement until questioning was completed.

Saiber then referred to Bobbskill's testimony that there is no CAA safety agent assigned to an airport between the hours of 5:00 p.m. and 8:30 a.m. He asked why.

Elwell replied that by statute, government employes work a 40-hr. week. It is not CAA's rule, he insisted; it is a statutory requirement. "But why from 8:30 to 5:00?" asked Saiber. "Why not from 5:00 to 8:30?"

Elwell said that is CAA policy.

"So that from 5:00 o'clock in the evening until 8:30 the next morning, there is no supervision of safety on the airport?" Saiber asked.

Elwell turned to Marsh for an answer.

Marsh said that CAA approved an airline's method of maintenance, and regularly checked to be sure that the approved maintenance procedures were being followed. He concluded with a strong defense of the airlines' safety precautions.

Saiber asked, "So you think it is adequate for safety to permit a commercial operator to supervise his own work?" Marsh answered that he did.

▶**De Seversky and Marsh**—Saiber recalled that in a previous hearing Maj. Alexander de Seversky had said there were two safety devices the airlines were not using that could have prevented the Elizabeth crashes. He identified these as the engine analyzer and Rato (Rocket assisted takeoff).

"Why isn't the engine analyzer required on commercial transport planes?" Saiber asked.

Marsh answered, "The engine analyzer will not prevent engine trouble; it only indicates it. I seriously doubt it would improve safety."

Saiber asked why Rato is not required. "Rato would not help safety," Marsh replied, and added that any new equipment injects additional complications which can actually compromise safety before the equipment is time-tested and is proved thoroughly reliable.

It was getting late. Saiber had not repeated the questions asked of Fluet regarding the alleged rehearsal of witnesses and the transferring of McConnell.

Sen. Hand asked a series of questions on CAA-CAB jurisdiction, then told Elwell he could make his statement.

▶**'Good of the Service'**—Elwell began by pointing out that the questions had not been asked him, but that nevertheless he wished to answer regarding McConnell's transfer. "There has been a reorganization of the aviation safety

units both in the regions and in Washington pending and has recently been completed," he said. "I have heard no reason for Mr. McConnell's transfer except for the good of the service."

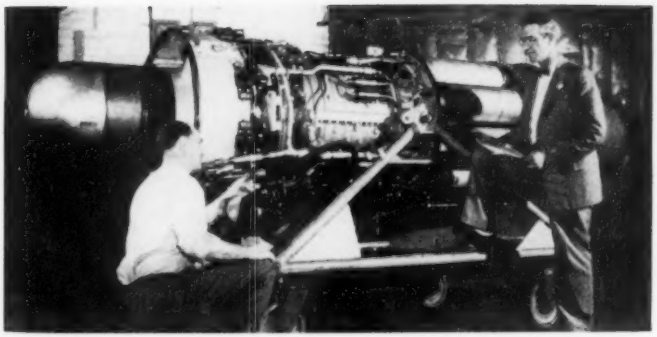
Elwell's cultured voice was firm. "There isn't a man in CAA," he continued reassuringly, "who is not willing to be transferred for the good of the service."

He said he resented insinuations of collusion between CAA and CAB agents as an attack upon the integrity of CAA. "I have served under six Administrators and I have yet to hear of anything between CAA and CAB except honest proposals on which they agreed or disagreed."

▶**Protecting People**—Hand asked Elwell if the CAA counsel had any suggestions for the committee. Elwell launched into an impassioned plea for the zoning of airports, recalling that the airports had been located before the residences that have sprung up around them. He reminded the committee that CAA had worked out a zoning ordinance with the city of Newark for Newark field, only to have the state court rule it unconstitutional in the absence of enabling statutes by the state legislature.

Zoning, he said, would have kept residences away from the airport although, as Hand quickly pointed out, the planes fell in Elizabeth, not in Newark.

Elwell acknowledged this, but cited the importance of zoning other areas. And the lights glared brightly on sleepy, smoke-filled eyes that seemed to see the ghosts of CAA's Old Guard stalk into the room as Elwell's voice rose to declare that "Sometimes we have to protect people against themselves."



GE Shows -27 Version of J47 Jet

Lockland, Ohio—A new member of General Electric's turbojet family, the J47-GE-27 now is in production at the company's Lynn, Mass., plant and shortly will be built here. It is slated for installation in the North American F-86F Sabre and FJ-2 Fury and is rated at about 10% greater thrust than the J47 engine powering the Sabres in Korea.

Basically new features on the -27 are the high-altitude starting system, thermal anti-icing and some accessory changes. First-stage compressor blades are longer than on earlier engines; this results in increased air handling and compressor ratio. And there has been some improvement in the specific fuel consumption.

▶**Celebration**—Announcement of the -27 engine was part of the Mar. 18-19 celebration of the tenth anniversary of GE's first jet-engine test run. The anniversary also was marked by the dedication of the new Lockland jet center. Upon completion, there will be nearly 4 million sq. ft. of production, office, engineering and administration space at the site.

First buildings added to the basic facility (which was built during World War II for the production of Wright piston engines) were office and factory areas. These were opened for general viewing for the first time during the celebration. And in one of the brand new test cells, the J53, GE's hottest competitive threat and most powerful engine, idled quietly.

A handful of J47 engines were on the production lines, and the first impression of the factory tour was that there was a lot of open, non-productive space. But the factory layout has been planned for high production and 12,000 people; right now, only 7,500 employes are working at Lockland, and tooling is incomplete.

During the celebration, GE honored the jet pioneers of the country. As part of the program, a "monument" engine—one of the first I-A jets built by GE—was unveiled by Lawrence Bell, whose company built the Bell P-59.

New Jets to Get Rocket Armament

First official indication that USAF jet fighters are swinging towards rocket armament in place of the more conventional .50-cal. machine guns was made last week by Air Force Undersecretary Roswell L. Gilpatric.

Gilpatric said that the North American F-86D interceptor was scheduled for rocket armament in lieu of machine guns. Pentagon and industry sources have disclosed two others. These are the new Lockheed F-94C all-weather fighter and the Republic F-84F swept-wing tactical support fighter. Northrop's F-89 all-weather fighter also carries rockets in addition to 20-mm. cannon.

There has been increasing emphasis by both Navy and Air Force to give fighters and bombers heavier, more powerful armament. And as aircraft weights, armor, speeds and altitudes at which combat is fought continue to increase, the conventional .50-cal. is rapidly becoming obsolete.

▶**Two Rocket Types**—Present missile armament which will equip the F-84F, F-86D and F-94C includes the U.S. developed 2.75 rocket and the Swiss Oerlikon 8 cm. rocket. Present Oerlikon production is being procured from the Swiss parent organization. As soon as Oerlikon-America gets its new facility completed the rocket will be produced in the U.S. The American subsidiary has already broken ground for its new powder and rocket assembly plant near Asheville, N. C.

The Oerlikon rocket measures approximately 3¼ in. in diameter and about 30 in. in length. It is considered superior to the 2.75 rocket because of its greater firepower and later design, according to reports from Air Force sources.

Most armament of new air defense planes such as the F-94C and F-86D will not be directed towards enemy fighters. Instead it is designed to intercept enemy bombers.

▶**Guns Have Place**—But at the same time Air Force armament experts point out the day of the conventional machine gun and cannon is not past. With present techniques it is virtually impossible to aim aircraft rockets other than forward. Big bombers, then, would find protective rocket armament of little value until air-to-air missiles are further developed.

So, in addition to development work in the field of missiles, both guided and pre-aimed, Air Force and Navy are continuing development of heavier caliber machine guns.

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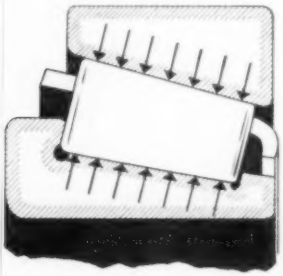

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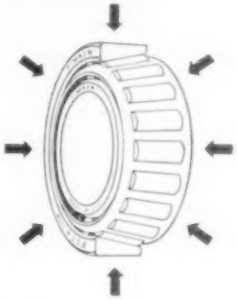

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Timken bearings hold shafts in positive alignment, prevent end-movement, minimize deflection. Gears mesh precisely, assuring a smooth flow of power.

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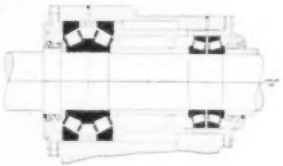

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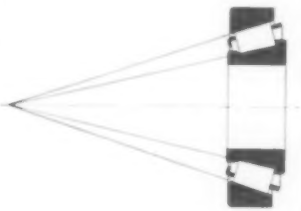

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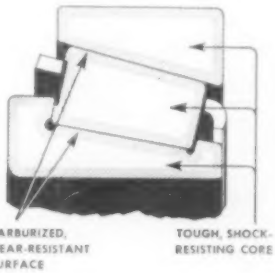

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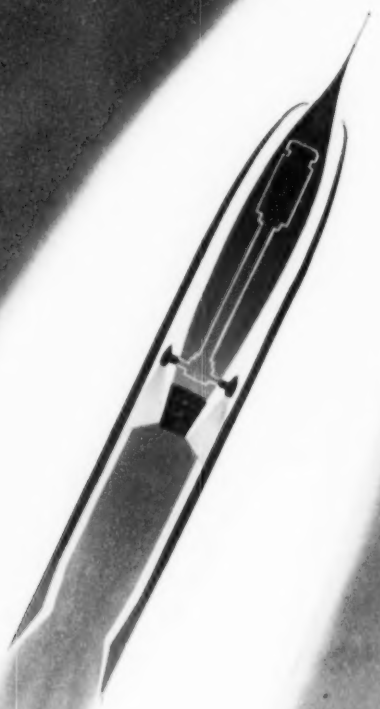

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Working Capital Changes

	1951	1950 (000 Omitted)	Change
CONVAIR			
Cash and Securities	$11,482	$ 7,421	$ 4,061
Accounts Receivable	45,198	26,975	18,223
Inventories	26,286	11,415	14,871
Current Liabilities	57,434	16,526	40,908
CURTISS-WRIGHT			
Cash and Securities	10,108	72,625	−62,517
Accounts Receivable	56,259	18,852	37,487
Inventories	56,017	29,611	26,406
Current Liabilities	38,702	24,625	14,078
DOUGLAS			
Cash and Securities	22,924	20,516	2,408
Accounts Receivable	39,940	23,117	16,822
Inventories	77,528	40,168	37,360
Current Liabilities	90,427	25,544	64,883
MARTIN			
Cash and Securities	10,657	7,274	3,383
Accounts Receivable	13,482	5,111	8,371
Inventories	31,400	18,969	12,431
Current Liabilities	69,060	24,100	44,960
NORTH AMERICAN			
Cash and Securities	12,427	13,320	−893
Accounts Receivable	32,247	11,697	20,550
Inventories	55,590	35,680	19,910
Current Liabilities	60,137	15,162	44,975
RYAN			
Cash and Securities	806	738	68
Accounts Receivable	3,669	1,319	2,350
Inventories	10,676	4,701	5,975
Current Liabilities	12,285	3,152	9,133

Banks Play Key Role in Air Plans

Heavy inventories tie up industry capital so return is made to World War II pattern of financing expansion.

Expanding aircraft production is now being financed on an ever-broadening scale by bank borrowing. This trend is revealed by the annual reports now being released by representative aircraft companies.

With one exception, the six companies examined and presented in the accompanying table have resorted to bank loans for necessary funds to finance present manufacturing programs. This practice is not unusual and follows the pattern of financing aircraft production during World War II.

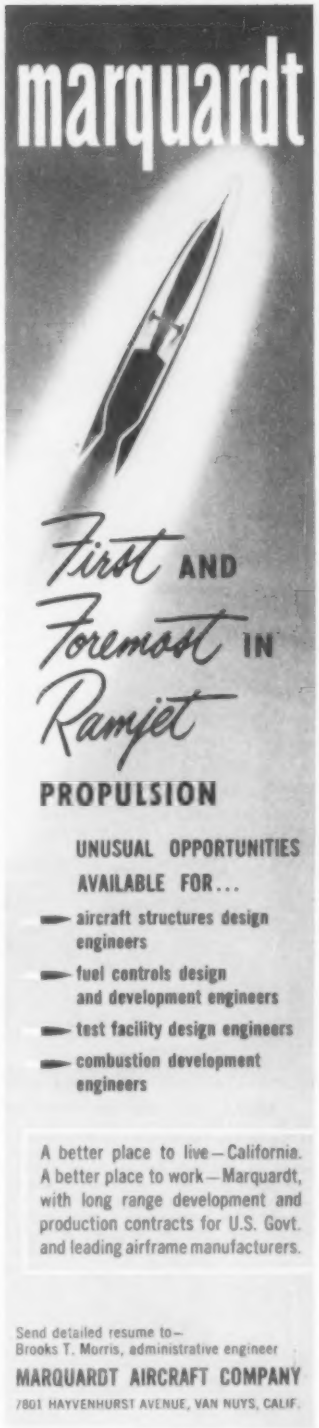
An important element lacking in recent years but present during the past of the aircraft industry is equity financing. During the early stages of World War II a large number of aircraft companies sold capital stock in order to obtain permanent working capital to conduct operations. But only one company, Northrop, has resorted to equity financing during the past year.

▶ **Banks Eager**—Permanent equity capital is now largely adequate for most aircraft companies. As long as the hope for sustained profitable operations prevail, sufficient accommodations will be available in the form of self-liquidating bank credits. Under such conditions, banks are eager to advance funds to finance the defense effort and can avail themselves of Federal Reserve Bank V-loans with the Air Force or Navy serving as guarantors for the credit extended.

In view of the long time lag in the completion of production contracts, substantial funds are involved in the form of inventories and work-in-process. Until shipments are completed and payment received, cash resources are drained to support inventory positions. At the completion of the cycle, inventories are worked off and cash again built up.

▶ **Volume Coming**—Balance sheet accounts of aircraft companies clearly reveal preparations in the buildup for volume shipments to be made later this year or even during 1953.

• **Convair,** for example, shows a gain of more than $14.8 million in its net inventory position from Nov. 30, 1950 to Nov. 30, 1951. To finance this volume, the company had $26 million in notes payable outstanding at the 1951 year-end. A total of $50 million in bank credit is available to the company as needed. Working capital re-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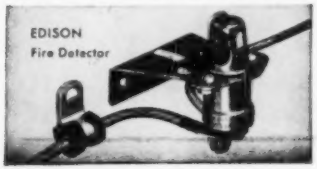

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quirements for Convair were somewhat reduced by more than $15 million in progress payments advanced by the government.

• **Douglas,** despite a vast expansion in its inventory position, received considerable assistance in the form of progress payments. Presumably, a good portion of these advances were received from the airlines with transports on order. Total inventories aggregated $191.7 million for Douglas at the 1951 year-end, but through advance and progress payments were reduced to only $77.5 million. Douglas has a $60-million bank credit but drew down only half, or $30 million, at Nov. 30, 1951. It is likely the balance of this credit will be utilized during the current year.

• **North American Aviation** has also had to utilize progress payments and bank loans to finance its production. At Sept. 30, 1951, the company received progress payments of almost $97.2 million to reduce its net inventory position to $55.6 million. In addition, the company had $20 million in notes payable outstanding in order to obtain needed working capital.

• **Ryan Aeronautical,** the smallest of the companies examined, utilized $9.5 million of its $12-million bank credit by Oct. 31, 1951. These funds were applied to finance inventories and receivables due on the San Diego company's government contracts.

• **Curtiss-Wright** is the only major aircraft company which did not resort to bank loans last year in order to finance its huge production backlog. The company's cash and securities position decreased more than $62.5 million, largely to finance inventories and accounts receivables due from the government. In this and other instances, slowness of the government departments to reimburse aircraft companies for items represented in accounts receivable has created an extra drain on working capital requirements.

► **Flexible Financing**—Most of the bank loans extended are in the form of 90-day notes renewable over a period ranging from one to about three years. This gives the borrower considerable flexibility in financing peak production requirements with the bank loans assuming a self-liquidating nature.

Not shown in the accompanying table but an important contributory factor in the industry's ability to handle increased production requirements is the steady "ploughing-back" or retention of available earnings during recent years. Such retained earnings were not only reinvested in plant facilities and even in current assets but helped contribute to stronger equity positions forming a broader base to facilitate bank credit accommodations.

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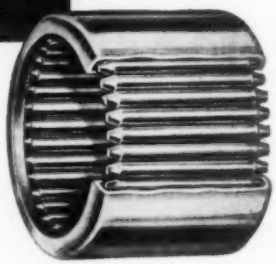

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Poor Coordination Slows Missiles Work

- **The United States will not get missile production in quantity until one office gets overall supervision.**
- **And an expanded Office of Guided Missiles with power to cut across channels might well do the job.**

By David A. Anderton

Lack of overall coordination of missile projects may be one major stumbling block in the guided missile program in the United States.

In spite of channeled responsibility for development of all auxiliary equipment—ground radars, servicing trailers, maintenance kits—there is little direct supervision of progress of any complete missile.

Instead, reliance is placed on the ability and initiative of each particular group to get its own job done on schedule.

▶ **Why Should We?**—The arguments for overall coordination are backed by the experience of industry. There the procedure is to appoint a project engineer or coordinator. His particular duties cut across channels of research, development, test, production and firings. His responsibilities are defined by nebulous words which tell him to assume full control of the missile from inception to acceptance by the military services.

In this way progress—or the lack of it—can be directly traced to the efforts of one man.

It means placing a tremendous load on one individual. But the aircraft industry is built on the concept of the project engineer and has made a success of the system.

But where this system does break down is beyond the doors of the prime contractor's plant.

▶ **For Example**—Take the fictitious case of a long-range bombardment missile being developed for U. S. Army Ordnance.

The contractor starts the research and development phases. During this time, he makes windtunnel test in the Ordnance facility at Aberdeen Proving Ground.

He also uses the test facilities of other services, such as the excellent tunnel of Naval Ordnance at White Oak, Md.

When he requires certain test facilities and equipment of his own or where building is involved, the Army Corps of Engineers enters the picture as consultants and designers.

When the contractor wants specialized avionic equipment, he must work with the Signal Corps. When he requires trailers or vehicles, he may have to get them from Quartermaster Corps., modify them at an Ordnance center and equip them with gear supplied by the Signal Corps.

The warhead for his missile may be developed either by Ordnance or by Chemical Warfare.

▶ **Coordination**—The project engineer works with his staff, and determines the requirements of the missile during all its life. He checks with the military sponsor of the project to verify the need for field and service equipment. And he draws subcontractors and vendors into the program.

On his shoulders lies the responsibility of making a schedule for the entire program: of estimating costs, manhours, production rates. And somehow he does this—not without enormous assistance, because any project engineer is, at best, only an entrepreneur—and the missile proceeds.

Working with the project engineer, but in no way responsible to him, is some military representative. He gets the job of handling interservice coordination and paperwork. If the Ordnance contractor wants to fire at an Air Force proving ground, the military rep gets to work. The request is channeled through the proper lines of communication to the proper place. The proper number of copies is acknowledged, endorsed and then passed along for proper action.

And right there is where the big stumbling block is thrown in the way.

▶ **Turndown**—If one of these myriad branches of the services decides that it cannot do a particular job in the time allotted, or that it is up to its ears in work, a polite refusal goes back through the channels. And nothing can be done about it until some higher authority is able to get at it. This is not accomplished overnight.

If the project engineer had authority, or if the military rep had the rank, then these jobs could and would get done on schedule. But it is wrong to be dependent on the initiative of people not even remotely connected with the job. It is wrong to be dependent on those who don't particularly recognize the merits of one job over the other.

The argument against any channel-piercing job is that it has to cut across too many lines of authority, and that things have always worked out well the other way. This is certainly true. But it's a weak argument, because industry has been operating by cutting through channels for years.

▶ **Suggestion**—It's been suggested that the Office of Guided Missiles could undertake this task. But at presently conceived, the OGM is a very high-level policy-making group which should rightly not concern itself with details. OGM's job is to determine what missiles are to be produced for the national defense, not to suggest how such missiles are to be designed.

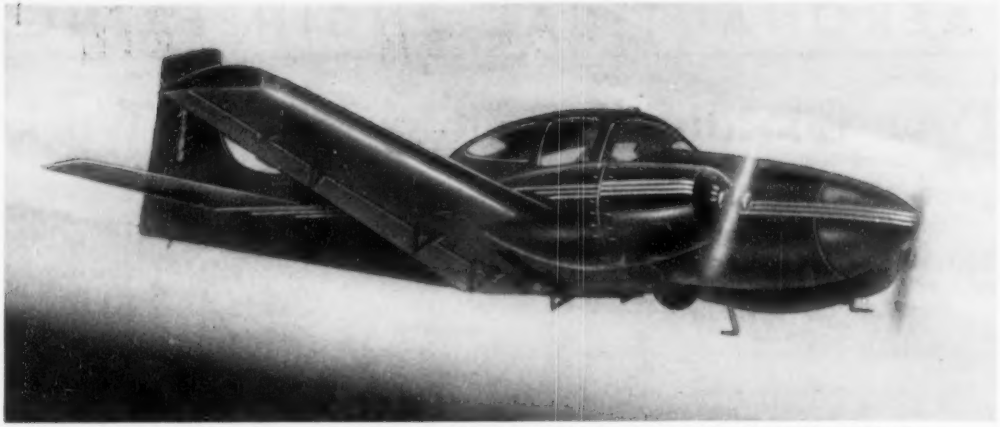
That's as presently conceived. But an expanded OGM could use the project coordinator system in its own organization.

The OGM staff needs not be unwieldy; there aren't that many missiles under development.

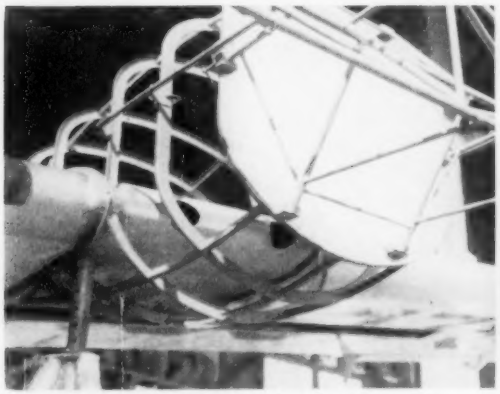
And high-level coordinations, or allotments of priorities within the missile program, could be settled within the walls of one office, instead of being kicked around from Pentagon to pillar to post.

▶ **Recommendation**—If we are ever to have guided missiles in quantity, without needless and ridiculous duplication of development and test facilities, we need to strengthen the Office of Guided Missiles. We need to give more power to its director and to his staff, so that pet projects, duplication and waste can be rammed out of the program despite the cries of misled sponsors. We need to assign the complete responsibility—and the necessary authority to do the job—in one place, to one group.

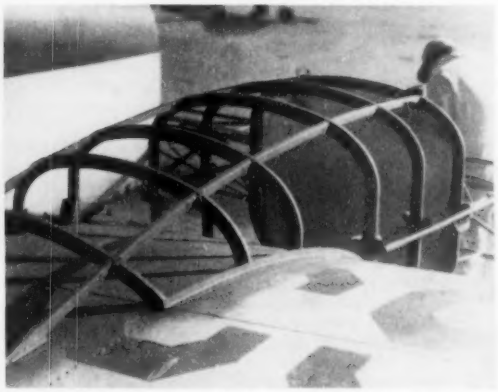
And then the guided missile will come into its own. It will cease to be a contractual plum, a political propaganda piece and an interservice squabble. It will stand on its own merits as a weapons concept which transcends the limited ideas of land, sea and air power as we know them today.



FLIGHT VIEW OF BI-NAVION shows the major changes from standard Navion—in nose, powerplants and vertical tail.



LEFT NACELLE shows firewall with engine pickup points.



RIGHT NACELLE before skinning shows simple structure.

Twin Engineered From Navion-Piper Parts

Dauby produces Bi-Navion conversion at a price which figures to be lower than for a new executive plane.

The twin-engined beauty shown above is the Bi-Navion, a brand-new development in light aircraft. It is basically a standard Navion airframe to which two Piper Pacer powerplants have been added.

It was developed to fit a specific industrial problem task—furnishing both executive transport and field service test work for Plastic and Rubber Products Co. And the total bill is expected to be lots less than the purchase price of such competitive craft as the Twin Bonanza or the Aero Commander.

Conversion was handled by the Dauby Equipment Co., Inc. of Los Angeles, with F. W. Anderson retained as engineering consultant. Fabrication was done by the Acme Aircraft Co., Torrance Municipal Airport, Calif.

▶ **What Was Wanted**—Keystone of the entire conversion project was the need for the increased safety of a twin-engined craft. Dauby had been operating a standard Navion for Plastic and Rubber Products and during 1951 had racked up 842 hours on the plane. This flight time was divided between executive transport and field service work on Plastic and Rubber's aeronautical "O" rings.

Such a high total use of one airplane —842 hr. per year is a daily average of about 2¼ hr.—prompted thoughts of getting another plane. And because some of the flights were made under conditions and over terrain that were considered unsafe for a single-engined plane, a twin was the definite choice.

At the time, there were no such small aircraft in production. So resolution of the problem led to two choices—a new design or a conversion.

Economically, the conversion seemed to be the better choice. And from Anderson's engineering point of view, the company's Navion was a natural for conversion.

▶ **Proven Components**—The first basic policy adopted was a simple one. Wherever possible, use proven components.

First and biggest of these was the standard Navion airframe. The particular ship selected for conversion was an early North American model with license N-91793.

To the basic airframe were added

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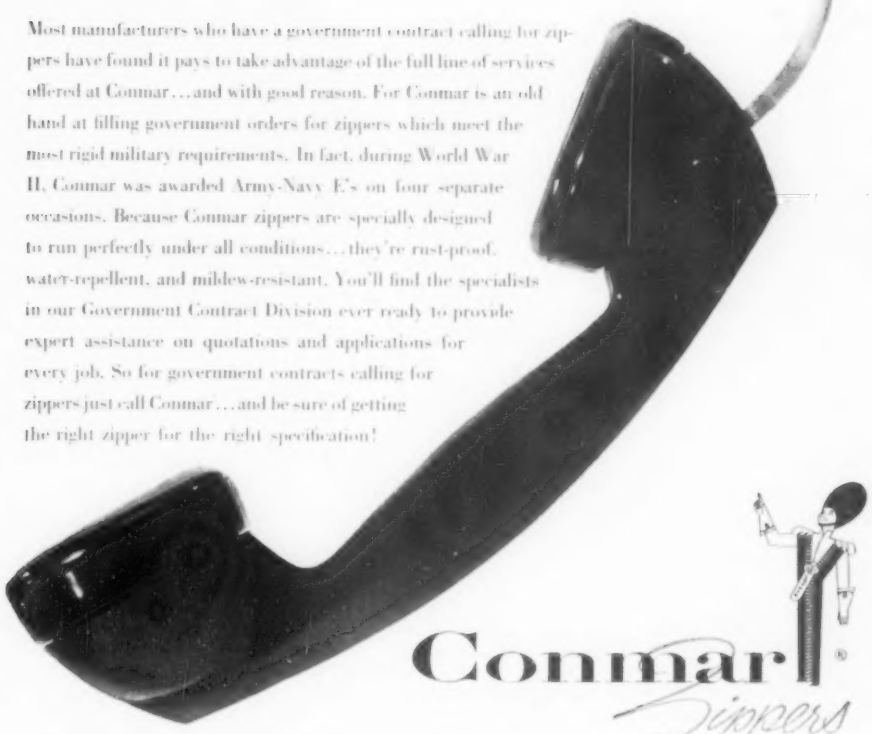

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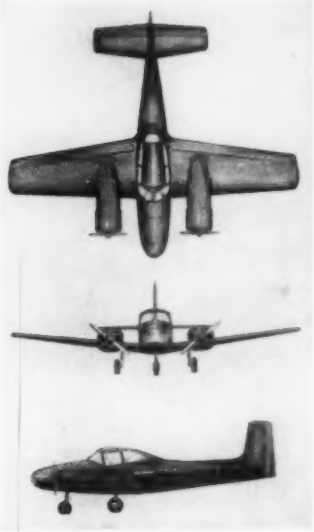

Bi-Navion Specifications

- **Wing span** . . . . . 33 ft. 4⅞ in.
- **Overall length** . . . . . 27 ft. 6 in.
- **Height at cabin** . . . . . 7 ft. 2 in.
- **Height at rudder** . . . . . 9 ft. 8¼ in.

Two Lycoming O-290-D four-cylinder opposed engines rated at 130 hp. ea. for takeoff. Sensenich Skyblade propellers, controllable-pitch, 74 in. diameter.

two power packages—each was actually the power section from a Piper Pacer—of proven ability. Engines are Lycoming O-290-D, developing 130 hp. each for takeoff and normal rated at 125 hp. each. Propellers are controllable Sensenich Skyblades of 74-in. dia. Thus everything forward of the nacelle firewall is identical to the Piper Pacer.

Location of the engine nacelles on the Navion wing was determined by the inevitable design compromise which considered weight, aerodynamics and structure. Aside from these three Fates which control all aircraft design, Dauby wanted to allow for additional fuel in the nacelle, and also for a more powerful engine. Both these changes were thought of as future possibilities.

▶ **Design Trio**—Anderson considered three basic types of nacelle structure:

- **Tubular members,** which were ruled out because they would bring concentrated loads into the wing structure and therefore concentrate all the wing strengthening.
- **Cantilever shear beams,** which took out torque loads by differential bending of the structure. This scheme was

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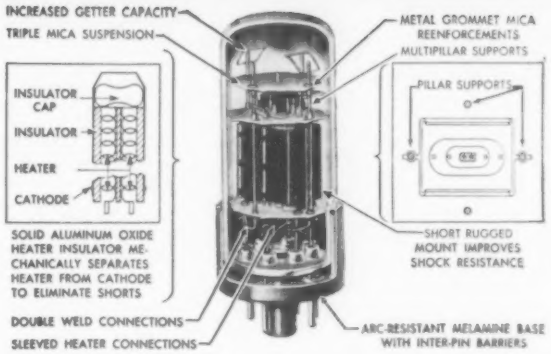

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Plate dissipation—(max.)	10 watts
Screen dissipation—(max.)	2 watts
Max. heater-cathode voltage	300 volts
Max. grid resistance	0.1 megohms
Warm-up time	45 sec.

(Plate and heater voltage may be applied simultaneously)

TYPICAL OPERATION

Single-Tube, Class A_1 Amplifier

Plate voltage	250 volts
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Grid voltage	−12.5 volts
Peak A-F grid voltage	12.5 volts
Zero signal plate current	45 ma
Max. signal plate current	47 ma
Zero signal screen current	4.5 ma
Max. signal screen current	7.0 ma
Plate resistance	45,000 ohms
Transconductance	4,000 μmhos
Load resistance	5,000 ohms
Total harmonic distortion	8%
Max. signal power output	4.0 watts

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BI-NAVION ON THE GROUND retains squared look and clean layout of Navion.

ruled out because analysis showed that the structure plus covering would be too heavy.

• **Semi-monocoque structure**, which was the final design choice. Such an arrangement carried distributed loads into the wing, and the nacelle skin could function as a load-carrying member as well as acting as a fairing.

The nacelle design starts at the firewall with the engine pickup points. The firewall is a complete ring with riveted sheet web. Behind the firewall is a second complete ring frame. The third frame is split in the wing chordal plane and clips to the skin near the leading edge. From the third frame aft, there are only partial rings.

All rings are of a formed channel section; two upper and three lower stringers pierce the rings and are clipped to them at each frame with simple, four-rivet clips. Aft end of each stringer is clipped to the wing skin.

A nacelle attachment angle runs along the ring-to-wing attachment clips on outboard and inboard sides of each nacelle.

► **Wing and Tail**—Wing modifications were not very complicated. The wing spars were extended, ribs were added under the nacelle attachment angles, and skin and stringers were reinforced locally to carry the extra loads. And some miscellaneous reinforcing was felt necessary.

Single-engine performance criteria usually demanded a larger vertical tail. Here again there were three possibilities for Anderson: He could extend the standard Navion tail, or build a new vertical tail, or find an acceptable component. His analysis showed that his best choice was to use a modified Navion horizontal tail, and that was done.

There was one other major change which stemmed directly from the twin-engine layout. A fuselage nose baggage section was designed fitted with side access doors.

Other changes included a new panel to accommodate more instruments, and toe brakes for better ground handling.

Soundproofing has been added, even though the noise level in the Bi-Navion cockpit started off at an inherently lower level than in the standard Navion, because of the increased distance between engines and cabin.

► **Performance**—First flight of the Bi-Navion occurred in early January, with John F. Martin at the controls for the maiden trip. Since then, about 40 hr. of flight time have been put on the airplane, enough to establish some preliminary performance figures.

Take climb, for instance. At a gross weight of 2,650 lb. (which is 200 lb. less than the expected license gross of 2,850 lb.) the Bi-Navion gets up and away at 1,600 fpm. Cruising performance is equally good. At 75% power, the twin scoots along at a little more than 150-mph. true airspeed.

Single-engine performance is also excellent. At a gross weight of 2,750 lb., the Bi-Navion will stay at 4,000 ft. with windmilling prop on the dead engine.

The Bi-Navion is scheduled for certification at a gross weight of 2,850 lb. under Part 03 of the Civil Air Regulations. Certification is expected to be complete by early April.

► **And What Then?**—Dauby, Acme and others connected with this project have been asked about their future plans for the Bi-Navion. The simplicity and the low cost of the conversion make it a natural for well-staffed and properly equipped overhaul bases.

Speaking for Dauby, Vice President C. J. Daubenberger said, "No decisions have been made as to the conversion of additional articles. This must await future developments. However, we welcome hearing from any reliable sources in the aviation field as to their respective ideas in relation to this project. Dauby . . . is a consulting engineering firm. We are not manufacturers, nor do we contemplate entering the aviation field other than as consulting engineers. . . . The project . . . has produced a category of aircraft for which there has been need for quite some time, at a cost which will be within reason."

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NACA Reports

(NACA Technical Notes are informal papers printed in limited quantities for domestic use only. They are obtainable, free of charge, only by persons having a professional interest in them. Write to Division of Research Information, NACA, 1724 F St., N. W., Washington 25, D. C.)

▶ Wind-Tunnel Investigation and Analysis of the Effects of End Plates on the Aerodynamic Characteristics of an Unswept Wing (TN 2440)—By Donald R. Riley.

The end plate is an aerodynamic handy perennial which blossoms from season to season. There has been sporadic interest in their use over the years, primarily as a device for increasing the lift curve slope and reducing the induced drag of an unswept wing. But in the past the analysis of end plate effects have given relatively few conclusions for their effect on lift-drag ratio and maximum lift-drag ratio.

The results of the tests in this report were in general agreement with all previous investigations. They showed that the end plates provided the basic wing with an increase in lift-curve slope, a reduction in induced drag, and an increase in maximum lift coefficient. There were negligible variations in pitching moment due to the end plate.

The new results indicate that the use of end plates may provide relatively large increases in lift-drag ratio at higher lift coefficients; but end plates should not be relied upon to provide substantial increases in the maximum lift-drag ratio of the wing. The most favorable effect on maximum lift-drag ratio is obtained when the wing aspect ratio is low and the ratio of wing profile-drag coefficient to end plate profile-drag coefficient is high.

The overall conclusion is that the use of end plates would seem to be of primary importance only when it is desired to keep the wing span as small as possible.

▶ Summary of Methods for Calculating Dynamic Lateral Stability and Response and for Estimating Lateral Stability Derivatives (TN 2409)—By John P. Campbell and Marion O. McKinney

Current design trends specifying low aspect ratio, sweepback and higher wing loadings have lead to unsatisfactory dynamic lateral stability in many cases. It is becoming necessary for airplane designers to make dynamic stability calculations early in the design stage of airplanes.

These calculations are difficult to perform where the designer has had no previous experience in this type of work. And unfortunately, most of the

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Time was when a scene like this would have created quite a stir around an airport, but that was before the non-transport plane had proved it could earn its keep. Today, of course, such sights are common from coast to coast. Hundreds of corporate owners maintain one or more craft of this type for the routine use of executives and key personnel, because they find it pays off in higher efficiency, saving priceless time, cutting overall travel costs. High among the factors responsible for the trend is the performance of the engine which powers so many of these business aircraft. Product of specialized experience dating from 1902, Continental is far and away the first choice for utility planes—first choice for *any* use where *dependability* counts.

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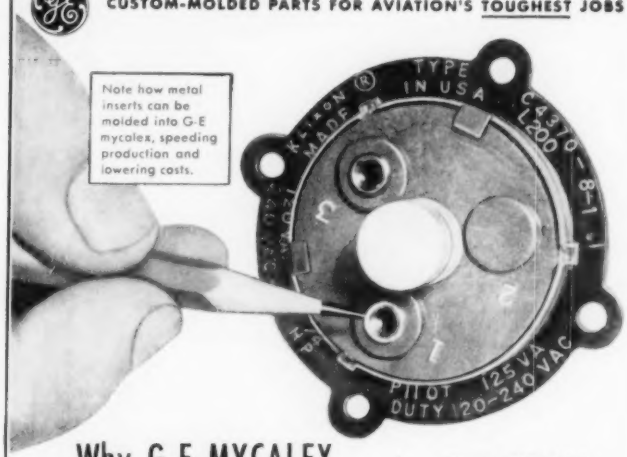

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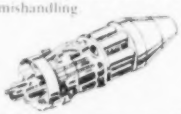

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published analyses are not presented in a form specially suited to computation. It has also been difficult to estimate the stability derivatives which are required for these calculations.

The purpose of the present paper is to extend earlier methods of computation. It includes those which are of current interest to designers and methods of estimating the derivatives for configurations and flight conditions are now being considered.

Simple and straightforward steps are presented for performing calculations of time histories of lateral motions, of the period and damping of these motions, and of the lateral stability boundaries. Existing methods for estimating stability derivatives are summarized and for some cases new and empirical formulas are presented.

A bibliography of 120 references includes reports which present useful experimental data for estimating the derivatives. Flight at low subsonic speed is considered in detail; only a brief discussion and references are given for transonic and supersonic flight.

▶Flight Investigation of the Effect of Transient Wing Response On Wing Strains of a Twin-Engine Transport Airplane In Rough Air (TN 2424)—By Harry C. Mickleboro and C. C. Shufflebarger.

This paper reports results of a flight investigation made on a Martin 2-0-2 transport airplane. The purpose was to determine strains associated with the dynamic behavior of the wing during flight through rough air. Different wing fuel loads and two speed conditions were specified for flights at altitudes between 3,000 and 4,000 feet in clear-air turbulence.

The results of strain measurements on the airplane in rough air and in slow pullups indicate:

- **Bending strains** per unit normal acceleration in gusts were about 20% higher than those in slow pull-ups for all measuring positions and flight conditions.
- **Dynamic component** of wing bending strains was primarily due to excitation of the fundamental wing bending mode.
- **Front and rear spar bending** strains at each spanwise station showed the same relation to each other in gusts and in slow pull-ups.
- **Data on spar shear strains** showed wide scatter.
- **Primary component of web** strains for the gust conditions was vibratory. It was anti-symmetrical with respect to the airplane centerline.
- **There was no significant** variation of structural dynamic response over the range of speed and weight conditions covered by the tests.

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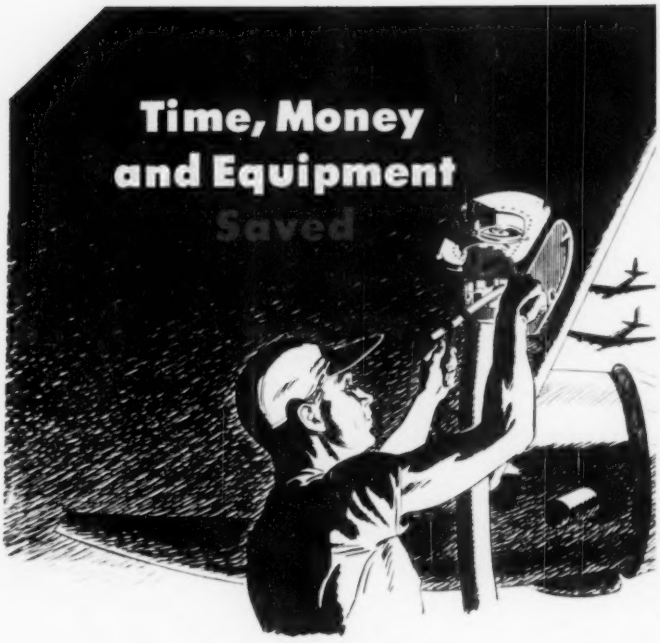

Today, fueling of military and commercial aircraft has been enormously speeded, time and equipment saved where Carter-designed and engineered *special-purpose* valves are in service. For example, Carter under-wing fueling valve and nozzle, meeting all NASC specifications, assure fast and flawless transfer of fuel from storage to aircraft, eliminate spillage, warped tanks, and personnel hazards. Other typical Carter developments in this field are

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1952 Pipers Fly Easier

A number of detail refinements to improve flying and handling characteristics marks this year's line of Piper PA-20 Pacers and PA-22 Tri-Pacers now coming off the lines at Lock Haven, Pa. Reflecting rising costs, the new models carry higher price tags than did 1951's airplanes.

Externally, the planes are characterized by larger, more spherical windshields, providing improved visibility. The conventional geared Pacer's landing gear is 12 in. wider than hitherto. Internally, the most noticeable change has been installation of a more useful instrument panel designed to provide optimum placement of the increasing number of instruments used by light plane pilots, particularly in the blind flight group. Other cabin innovations include better air conditioning and sound proofing. 100% increase in heater capacity.

The powerplant again is the Lycoming O-290-D rated at 125 hp. at 2,600 rpm., turning a wooden, fixed pitch prop or Aeromatic or Sensich controllable models.

Prices on the PA-20 and PA-22, fly away factory (last year's prices are in parenthesis):

• PA-20 Model 125 standard $5,175 ($4,295); de luxe $5,265.35 ($4,385.35); custom $5,865 ($4,885.75).

• PA-20 model 135 standard runs $5,660 ($4,780); de luxe $5,741.35 ($4,861.35); custom $6,205.39 ($5,225.39).

A PA-20 minus engine, model not given, costs $3,924.17.

• PA-22 Tri-Pacer Model 125 standard model is priced at $5,355 ($4,565); de luxe $5,445.35 ($4,655); custom $5,987 ($5,907).

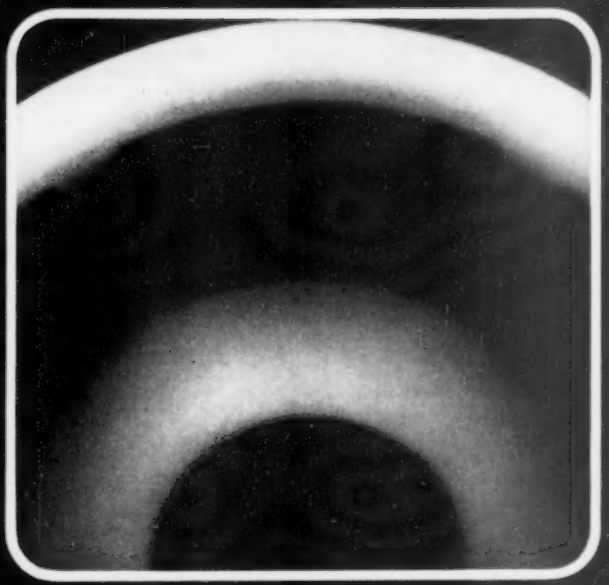
• Model 135 Tri-Pacer standard is $5,840, de luxe $5,921.35, and custom $6,327. A Tri-Pacer minus engine can be had for $4,099.17.

AF to Commission Specialist Officers

Reserve commissions for procurement control and production officers are being offered by the Air Force through the First Air Force, Mitchel AFB, N. Y. The AF will commission men who have either a master's degree, or a bachelor's degree plus one year of business experience in industrial management or the field of production control or materials procurement.

According to the AF announcement, there are a large number of openings for lieutenants and captains, as well as for older men with wider experience in these particular fields. Particular needs are for men with experience in

Big loads
going up–



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That is why this crane wheel was checked by radiography. It was the one way to prove whether gas pockets or other internal defects might exist to cause a hazard.

Foundries working with all kinds of metals and alloys are finding it increasingly important to radiograph their castings. Then they know only quality products are released. Also in planning long production runs, radiography of pilot castings often indicates ways to improve methods and increase yield.

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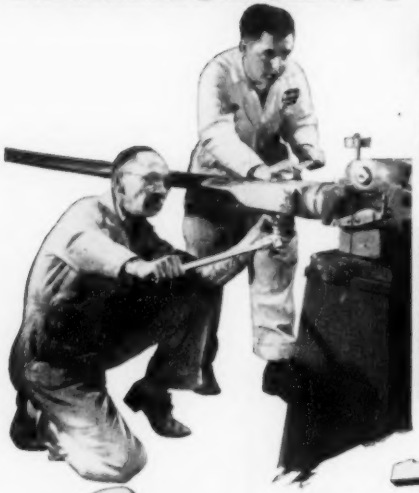

Tightening capscrews attaching pitch horn to main rotor assembly.

Adjusting tail rotor linkage, ferret ratchet and open end wrench.

Tightening tail rotor shaft lock nuts, combination and open end wrench.

*Snap-on Tools

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Tensioning gimbal ring retaining screws, main rotor hub assembly.

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In addition reserve commissions to qualified civilians with master's degrees in science, mathematics or economics, are being offered.

These commissions will implement the rapid expansion of the AF in specialized technological fields.

Grades from first lieutenant to lieutenant colonel will be awarded, according to age. Applicants must be over 27 years old, now in civil life, and must have master's degrees in any of the physical, biochemical and chemical sciences, mathematics, economics and the political sciences.

Queries should be addressed to the Director of Military Personnel Procurement, First Air Force, Mitchel AFB, New York.

NAA Flies AJ-2P

North American Aviation Inc.'s Columbus division has test-flown the first AJ-2P carrier-based Navy photo reconnaissance bomber. Meanwhile, NAA's Los Angeles division has leased over 9,400 sq. ft. of factory area in Culver City, Calif., to handle work for its electro-mechanical department, which designs and develops automatic pilot, fire control and navigation systems for aircraft and missiles.

SCIAKY SPOTWELDER joints record thicknesses, Republic says, such as this aluminum alloy specimen consisting of two ¼-in. pieces. Cross-section is at top.

Spotwelder Speeds Republic Joining

The spotlight is being put on spotwelding at Republic Aviation Corp. This increasingly important joining process is going to be extensively used in the production of the new Thunderjet model—the F-84F.

Republic's present interest in spotwelding stems from the company's Machine Capability Exploration program. Experimentation on the process began after World War II with a study of spotwelding feasibility for aluminum alloys thicker than .081 in. Maximum thickness that was commonly spotwelded during the war was .065, says Republic.

► **80 and 100 per Minute**—When Republic purchased its huge Sciaky three-phase frequency converter spotwelder, top capacity was specified to be ⅛-to-¼-in. thicknesses. Refinements in the equipment and technique have boosted this capacity to ¼-to-⅜-in. thicknesses. And more than 80 spotwelds per minute are being squeezed out for wing skins.

Present effectiveness of the machine was brought about by Republic-Sciaky teamwork. Important refinement feature was installation of improved air regulators and pressure gages to give a better control of pressure. Technique improvements were worked out by Republic's Kastelowitz and Imholz, chief tool and welding engineers, respectively.

Immediate benefits of the welding program are increased production, economy in labor skills, and lower costs. The 80-per-minute rate on high strength aluminum alloy compares with the 15-per-minute rate for automatic riveting (one automatic machine—the General Drivmatic riveter—has a 22-rivet-per-minute potential, but 15 is the production rate used at North American Aviation). On internal structures, not subject to aerodynamic stresses, Republic has been welding up to 100 spots per minute.

► **Quality Good**—Republic says that the chief drawback in riveting is the multiple operation involved—hole drilling, countersinking, then riveting—as against

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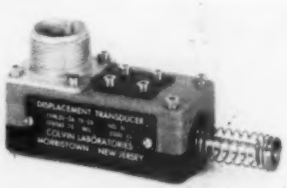
the single simple spotwelding operation. The company also contemplates using spotwelding to replace bolting in some operations.

Chief criticism of spotwelding—that it may not insure uniform quality—has been dispelled at Republic by intensive studies which reveal no deficiencies. Welds involved in joining two ¼-in. thicknesses have withstood loads of 10,500 lb. per spot, while welds in which ¾-in. thicknesses were joined to ¼-in. material have stood up under 14,000 lb. per spot.



Small Transducers For Guided Missiles

A series of small linear displacement potentiometer-type transducers with strokes of 0.2 to 5.75 in. is being manufactured by Colvin Laboratories. The units are designed for guided missiles or other airborne applications.

The manufacturer says the transducers have a linearity of 0.5% or better on units with strokes of 0.75 in. or more; 1% on shorter strokes. Resolution of at least 0.004 in. can be obtained, with improved resolution with increased stroke length. All units are available in resistance values of 100 to 15,000 ohms per inch of stroke, with threaded shafts. For strokes of 0.75 in. or less, spring return shaft construction is available.

Colvin Laboratories, Morristown, N. J.

Quick Change Stratofreighter

A Boeing KC-97 Stratofreighter, fresh off the production line at Renton, Washington, made the transition from aerial tanker to cargo plane in just 7 hr. 15 min.—then the next day was converted back to a tanker in 5 hr. 36 min., with another 4 hr. 40 min. required for functional checks and adjustments of the tanker equipment.

During peak points in the conversions, 32 men participated, with the tanker-to-cargo job taking 164 manhours and the reverse taking 152.6 manhours. The functional check of

Defense Needs More Scrap

tanker equipment required 23.5 man-hours.

The demonstration was run off for 23 Air Force representatives from the Air Materiel Command, Oklahoma City Air Materiel Area, Wright Air Development Center, Strategic Air Command, SAC's 2d Air Force, Military Air Transport Service headquarters and MATS' Brookley AFB, Ala.

THRUST & DRAG

Noteworthy quote from Dr. Harald Neilsen, chairman of the department of physics and astronomy at Ohio State University, speaking of their current research on the presence of carbon monoxide on the sun: "I don't know to what specific use the Air Force is putting the information we are supplying it, but it must want to find out these things or it wouldn't be spending so much money."

Aircraft companies seeking extensions to their laboratories might do well to investigate the facilities of the Armour Research Foundation of the Illinois Institute of Technology. In the Foundation's annual report, covering the fiscal year ending Aug. 31, 1951, the list of projects bearing on aeronautical problems is an impressive one. But such investigations are in the minority, nevertheless. Only private industry sponsoring research which might be termed aeronautical is Westinghouse Electric Corp. All other listed projects are Air Force and Navy.

New York University's College of Engineering announces a new graduate course—"Introduction to Rocket Propulsion"—to be taught by Alfred Africano, pioneer rocketeer and staff engineer in charge of Aircraft Rocket Motor Design and Development for Curtiss-Wright's propeller division. The course will cover fundamentals, motor design theory, flight principles, rocket aircraft, solid and liquid propellants, materials, stresses, heat transfer, components and applications. Prerequisites are aerodynamics and thermodynamics.

New plan of the Air Force is to accelerate post-graduate basic research in American universities. This will broaden fundamental knowledge required as a starting point for applied research and development of future air weapons. AF's Office of Scientific Research is sponsoring the endeavor with particular emphasis on graduate study in the fields of fluid mechanics, physics, chemistry and mathematics. OSR will work with educational and industrial organizations to initiate and administer a broad research program, relevant to AF fields of interest, through contracts. Word has gone out that universities and research organizations who desire to cooperate with the AF in the program should communicate with the Office of Scientific Research, Air Research and Development Command, P.O. Box 1395, Baltimore 3, Md.—DAA

"I don't suppose altitude bothers you very much." Boeing Magazine

The best way to get rid of dirt, muck, paint, oils and grease, sludge and light carbon, is the new approved cold-tank cleaner, KELITE FORMULA 1006. It cleans aircraft engines and parts in a remarkable way, without heat or the danger of fire... with complete safety to all metals. Used with Kelite pH Control, FORMULA 1006 really speeds up maintenance and overhaul cleaning.

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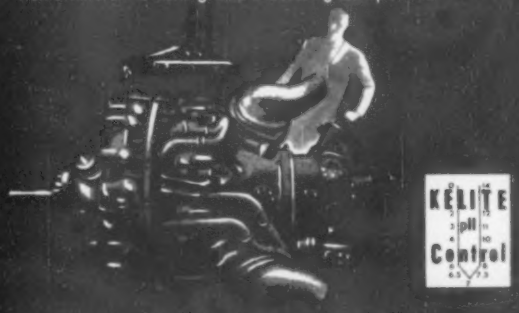

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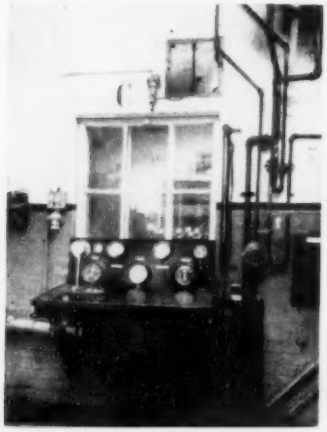
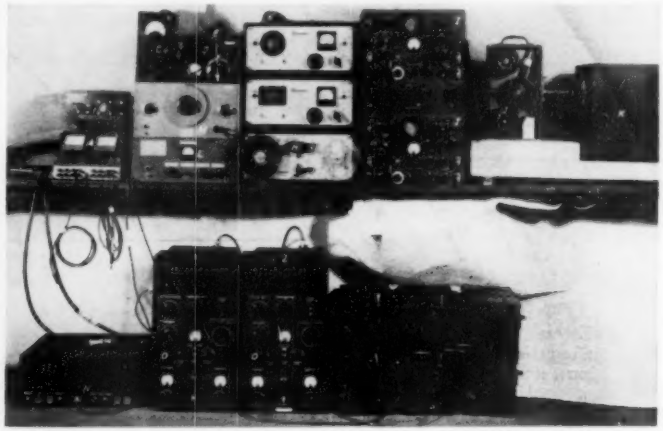


THEN (25 years ago) P&WA used few instruments to test engines.



NOW a battery of electronic instruments are needed to measure the additional data required for testing jet engines. Only part of equipment is shown.

Jet Instrumentation Turns to Avionics

Turbojet makers are assembling staffs of electronics specialists to tackle new measurement problems.

By Philip Klass

Jet engine manufacturers are being forced into a brand new field—electronics—as they seek to solve the greatly increased measurement problems which they face in testing new jets.

Because most of the data they need can most easily be measured with electric or electronic devices, and because these devices are seldom available commercially in the form or accuracy required, jet manufacturers are busy assembling staffs of electronics experts.

Some of the measurement problems, such as obtaining data on aerodynamic flow and combustion, are new to former piston-engine manufacturers. Other measurements pose a problem because jet testing demands higher accuracies. For example, an error of 1% in measuring rotor rpm. could throw engine thrust off by 7%.

These are some of the conclusions to be drawn from a paper on "Instrumentation for Aircraft Gas Turbine Development," given by R. E. Gorton and B. E. Miller during a recent Detroit meeting of the Society of Automotive Engineers. Gorton is a development engineer and Miller is an assistant project engineer, both with Pratt & Whitney Aircraft.

▶ **Information Needed**—As the engine designer tries to push thrust up and specific fuel consumption down, he needs quantitative answers to lots of engineering questions.

- Mechanical: What is the output thrust? engine rpm.? acceleration characteristics? rotor run-out? vibration amplitude and frequency? temperature of the rotor and blades? and others.
- Working Fluid: What is the temperature and pressure distribution? flow angle and velocity? fuel flow rates fuel-to-air ratio in the burner? of the discharge gases?

▶ **Thrust and Rpm.**—The key to accurate thrust measurement lies in the associated measurement of rotor rpm. So P&WA engineers set their rpm. accuracy bogey at 0.1%. This requirement scuttled the use of tachometer type indicators and the use of a 60-cycle power reference. Power companies don't try to hold power line frequency "on the button" over short intervals of time. The answer, according to Gorton and Miller, is to use the more complex tuning-fork or crystal-controlled electronic oscillators.

▶ **Rotor Run-Out**—When measuring the clearance between the engine rotor and its case the rotor itself becomes a part of a magnetic signal circuit. Rotor blades induce voltages inversely proportional to rotor clearance in electromagnetic pick-offs mounted inside the case. If non-magnetic (ceramic) rotor blades come into use, the problem gets more difficult, but Gorton and Miller think that a capacitance-type pick-off could then be used.

▶ **Simple Solution**—Some problems don't require a solution steeped in electronics. Take for example the problem of warning when there is danger of actual rubbing between rotor blades and the case. Tiny insulated wires are attached to the inside of the case so they project a few thousands of an inch toward the rotor. If the blades come too close to the case, they scrape the wires, causing a warning light to flash before actual case-rotor contact occurs.

▶ **Vibration**—Measuring vibration with electromagnetic pick-offs is not a problem, unless there is no rigid external member to which the pick-off can be attached (for example, a rotor-supported bearing in an axial-flow engine). But if it is mounted internally, the pickoff is exposed to 500F "cooling" air from the discharge end of the compressor, well beyond the pick-off's temperature limits. That requires a special insulated housing for the pick-off, with outside cooling air piped in.

The problem in measuring vibration in turbine and compressor blades is not in mounting the strain gages, according to Gorton and Miller, but in recording their signal output. A range of vibrational frequencies up to 30,000

(*Continued on p. 47*)

Can You Identify this Registry?

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*Brazil	PP, PT	*Iceland	TF	*Peru	OB
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*Canada	CF	*Indonesia	PK	*Portugal	CS, CR
*Ceylon	CY	Iran	EP	*Philippine Republic	PI
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*Dominican Republic	HI	Luxembourg	LX	Turkey	TC
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* VICKERS AIRCRAFT HYDRAULICS IN USE

This table includes all nationality marks that have been formally notified to ICAO up to September 30, 1951. Those countries marked with an asterisk have registered commercial aircraft which use Vickers hydraulics. Write to Vickers Incorporated for a 2½" x 4" plastic wallet card which gives you a permanent record of world civil aircraft registration codes.

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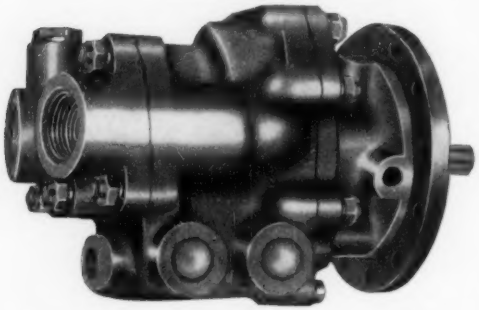
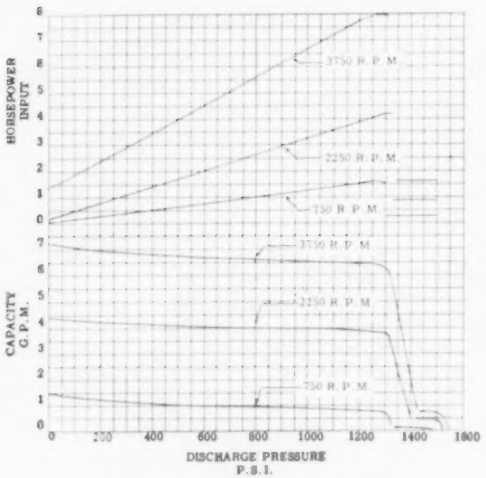
SIX BIG REASONS for using Pesco unloading hydraulic gear pumps:



Capacity: 2 g. p. m. @ 1500 r. p. m. @ 1250 p. s. i. Maximum operating pressure 1500 p. s. i. Weight: 8.9 lbs. approx.



This chart shows performance characteristics of Pesco Unloading Pump. Write for detailed engineering drawings and performance data.

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2. Easier to recondition

3. Longer service between overhaul periods

4. Lighter weight

5. Lower initial cost

6. Lower maintenance costs

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PRODUCTS DIVISION

BORG-WARNER CORPORATION

24700 NORTH MILES ROAD BEDFORD, OHIO

(Continued from p. 42)

cycles, the resolution required for accurate transcribing, and the relatively long recording period necessary to catch the full engine acceleration, preclude using an oscillograph. But if the data is recorded on a magnetic tape recorder, and played back at reduced speeds, a conventional oscillograph can handle the proportionately lower band of frequencies.

▶ **Rotor Temperature**—Turbine blade creep and breakage studies require data on blade and disc temperatures which can be obtained using thermocouples. The problem here is to transfer the small thermocouple signal voltages from the high-speed rotor to stationary recording devices without serious loss of signal strength. To prevent signal loss, P&WA has developed their own slip-ring transfer unit which uses chromel and alumel rollers and sliprings, the same material used in the thermocouples and leads.

▶ **Burner Temperatures**—When temperatures get above the useable range of thermocouples, Gorton and Miller suggest using a two-orifice probe. The mass flow through the probe can be determined by measuring pressures and temperatures at the second orifice; hence the temperature at the first orifice can be obtained by calculation from measurement of its pressure.

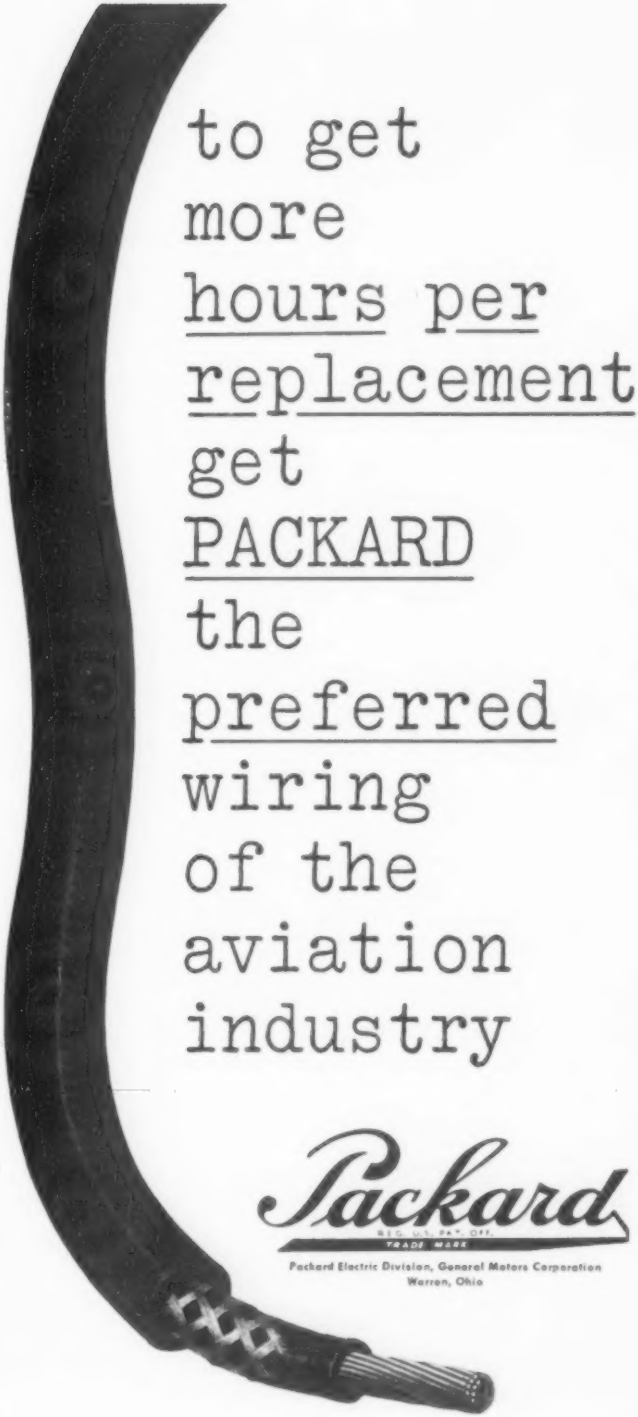
▶ **Automatic Control**—To measure temperature and pressure throughout an engine, P&WA is using an automatic remote-controlled probe-positioner. The device, which they developed, uses a self-balancing servo system to align the pressure probe for zero differential pressure across its inlets, thus automatically establishing flow direction.

With hundreds of measurements to be recorded at each step in an engine test, P&WA has developed an automatic plotting machine called the "Plottomac."

▶ **The Plottomac**—The new device plots flow angle, total temperature, and total pressure for any particular engine stage as a function of the circumferential position of the measuring probe. Each of the three variables is plotted on a separate recorder. Each recorder's writing then is servo positioned along the "Y-axis" in accordance with the magnitude of flow angle, temperature, or pressure. Another servo system drives the recorder chart paper proportional to the circumferential position of the probe unit. Thus any point on the chart's "X-axis" represents a particular point around the periphery of the engine for the particular flow angle, temperature, or pressure recorded.

The depth of the probe (radial movement relative to engine spin axis) is manually set by remote control.

▶ **Fuel Flow**—Conventional fuel-flow



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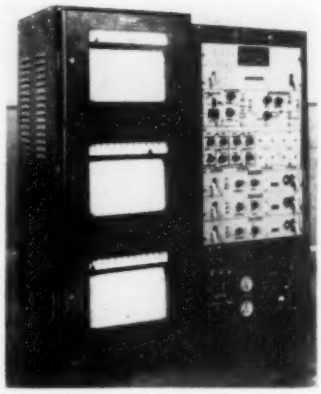

PLOTTOMAC automatically records jet data.

indicators are satisfactory for steady-state conditions, but they have too much inertia to measure rapidly changing conditions such as might be encountered when a fuel-metering valve becomes unstable. Gorton and Miller suggest the possible use of direct electrical properties of a liquid flowing through a magnetic field to make transient flow measurements.

▶ **Burner Studies**—The method of extracting the gas sample can be a serious source of error in analyzing fuel-to-air ratios. Unless the sample is obtained from an upstream sampling tube, with the rate adjusted to equal free-stream velocity, the authors say that the sample may not represent actual conditions in the burner.

▶ **Note of Caution**—Gorton and Miller stressed that instrumentation engineers need a good grounding in physics, thermodynamics, sound, vibration, and particularly electronics. They caution that unless instrumentation engineers fully understand the limitations of their instruments and measuring techniques, the test data can easily lead to false conclusions. Recognizing that engine manufacturers are relatively new to the electric and electronic instrumentation fields, the authors emphasize the need for frequent calibration of laboratory and test instruments to basic standards.

Measuring Report

A new "heat pulse" technique to speed measurement of heat rise characteristics of capacitors used for temperature compensation of tuning or similar circuits in electronic equipment has been developed by Naval Research Lab. Technique is described in new report: PB 105,746, "A New Instrument for Rapid Measurement of Capacitor Temperature Coefficients." Price $1.00; Office of Tech. Services, Dept. of Commerce, Washington 25, D. C.

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PRODUCTION

Why Production Lags in Britain

Shortages in skilled labor and key machine tools hold up efforts to build substantial air power, aid NATO.

(*McGraw-Hill World News*)

London—Last year it took the British aviation industry 15 to 17 months to deliver an order for an aircraft already in production. Now it takes 18 to 26 months.

Last year orders for new types carried delivery dates from 21 months to two years. Now it takes 23 months to 29 months.

This evidence, given by the Ministry of Supply to Parliament's "watch dog" committee on rearmament early this year and just made public, gives the dimensions of Britain's current production bottleneck. With it goes a general 10% price increase in the cost of all rearmament items. Last year's bomber (probably a Canberra) cost $217,000; this year's bomber costs $250,000.

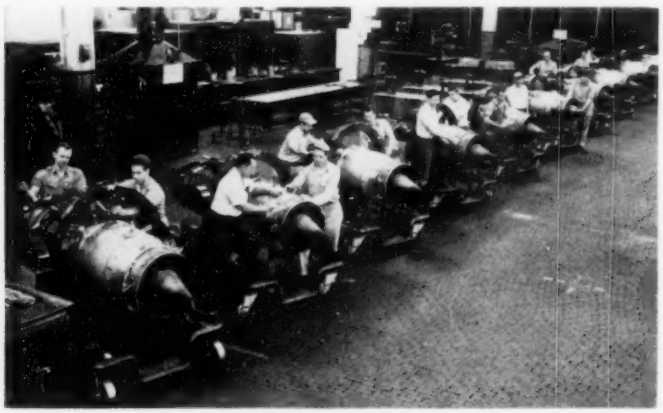
▶ **Shortages**—Evidence supplied by five members of the Society of British Aircraft Constructors showed that the old troubles—labor, materials and tools—were still plaguing the industry. SBAC's evidence, supported by the Ministry of Labor, pointed up the fact that the shortage of skilled labor could only be filled by transfers from other industries. SBAC argued that a large reserve of skilled labor still existed in less essential industries.

SBAC members didn't agree on the effects of materials shortages. Three said production was being held up; two said it wasn't. Steel was the worrisome item.

Some SBAC witnesses reported that "The provision of American tools is very disappointing and deliveries have been well behind promises in the comparatively few cases where promises have been made." Others thought the tool situation all right in relation to the reduced amount of work going on due to labor and materials shortages. The tool problem looks like one of spot trouble caused by lack of a few key tools—particularly for the Avon engine program.

▶ **Few New Planes**—The hearings of the committee, while held over a month ago, still take a lot of wind out of the announcement from Lisbon this week that over a third of the 4,000 aircraft to be flying for NATO by the end of this year will be British. It seems likely that this figure includes large segments of the RAF based in the U.K., as well as the RAF's 2nd Tactical Air Force on the continent.

Foreign Minister Eden said in Commons recently that he expected considerable "blending" of RAF and other European air forces in the near future. Air Minister Lord de L'isle and Dudley said last week that the 2nd Tactical Air Force will get the biggest expansion in the RAF this year. Together with the Meteors and Vampires now flying and being supplied to Belgian, Dutch and French air forces, the British may well have more than 1,300 planes in the NATO air force this year. But the production outlook indicates that a good many of these planes already exist.



J34S ROLL DOWN KC LINE

Westinghouse J34 axial-flow turbojet engines are seen on a portion of final assembly line at the company's huge 85-acre Kansas City assembly plant, built during World War II. These engines are getting final touches prior to delivery to Navy contractors. KC plant concentrates on volume production of service-approved jets; engineering, development and prototype is handled in So. Philadephia, Pa.

Solar Gets Big New Contracts

Solar Aircraft Co., San Diego, has stepped into the huge Westinghouse J40 engine program in a big way. Solar has gotten a $13-million letter of intent from licensee Lincoln-Mercury division of Ford Motor Co. for facilities, tooling and production of afterburners, combustion chambers and other hot parts for the 10,000-lb.-thrust-class turbojet.

It is emphasized that this largest single order ever received by Solar is mostly for facilities and tooling, indicating further large orders are in the offing on this project alone. The company will handle the work at its big new Wakonda facility in Des Moines, Iowa.

Other recent Solar successes in picking up important new contracts include a large order from Allis-Chalmers for hot portions of the 5,700-shp. P&W T34 turboprop engine. A-C is one of Pratt & Whitney's prime sources for T34 components. Still other orders have been received from Allison, USAF, USN, General Electric and Packard Motor Car Co.

In all, this recent business brings Solar's backlog to an all-time peak of $87,424,000—not counting Lincoln-Mercury's letter of intent—up considerably from last year's $41 million.

The West Coast producer is celebrating its 25th anniversary this year.

Expands Turbojet Equipment Business

To serve the vastly expanding aircraft gas turbine accessory market, General Electric has set up a new operation—the Accessory Turbine branch—to concentrate upon this phase of the jet engine and aircraft field.

Named head of the new branch is J. P. Turner, Jr., formerly sales manager of GE's Lynn, Mass., operation and at one time coordinator of subcontract facilities at Lockland, Ohio.

Accessory Turbine will be concerned with development and production of

turbosuperchargers and impellers, jet engine starters, turbine-driven fuel pumps, and air-turbine drives for alternators and hydraulic pumps. Headquarters will be at GE's River Works plant, Lynn.

Convair Supervisors Going to College

Supervisory personnel at Consolidated Vultee Aircraft Corp.'s Ft. Worth division are going to college.

Courses in management will be offered these workers at Texas Christian University. Sponsoring group is Convair's Management Club. Initially, two courses will be given—human relations in industry, and production costs—but eventually the studies will be expanded to include a full curriculum leading to a degree in management.

Each semester, the ten highest ranking students will be reimbursed for their tuition, the money coming from a scholarship fund created by the Management Club.

This is the second university training scheme inaugurated by Convair in the past six months. Earlier, the division began operating an engineering training program, in cooperation with Southern Methodist University, on the undergraduate and graduate levels.

PRODUCTION BRIEFING

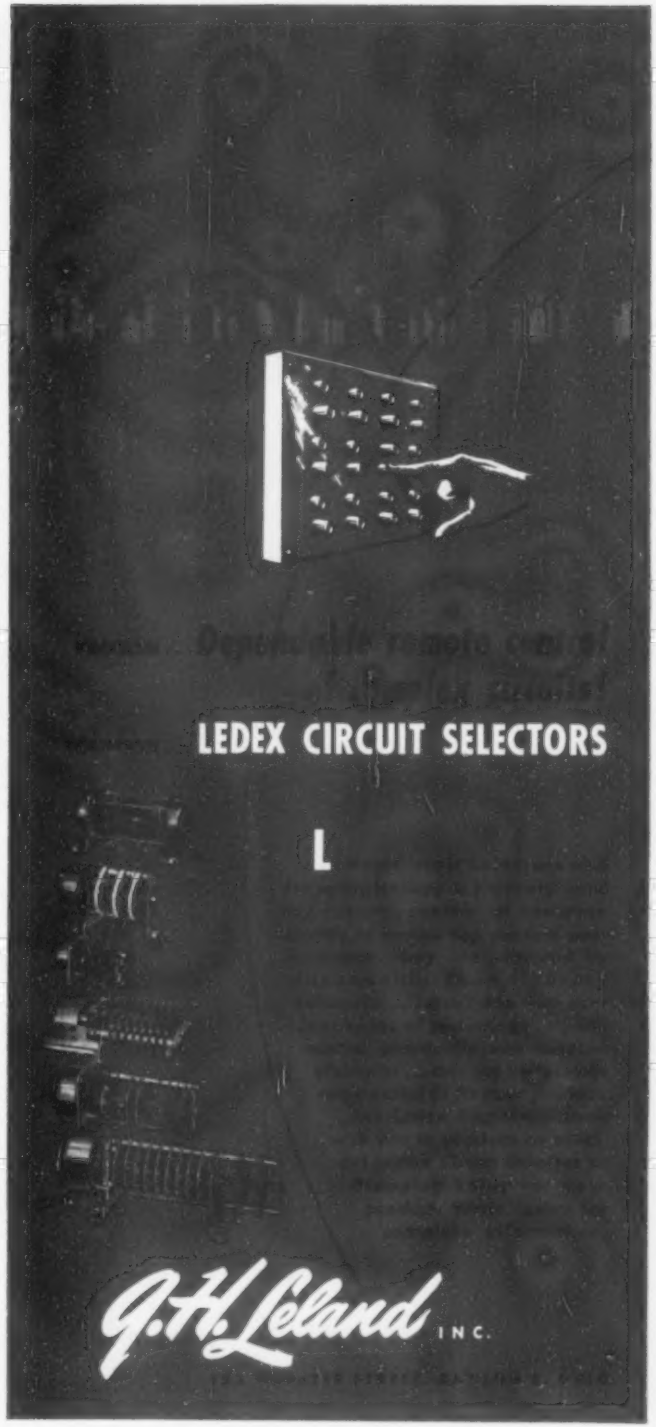
► **Aeroquip Corp.**, Jackson, Mich., has terminated arrangements with its South-Southwest distributor, Aeroquip Sales and Engineering, Inc., Ft. Worth, Tex., and will handle sales and service relations directly with customers in that region. Rearmament program and changing economic conditions are given as reasons for new plan.

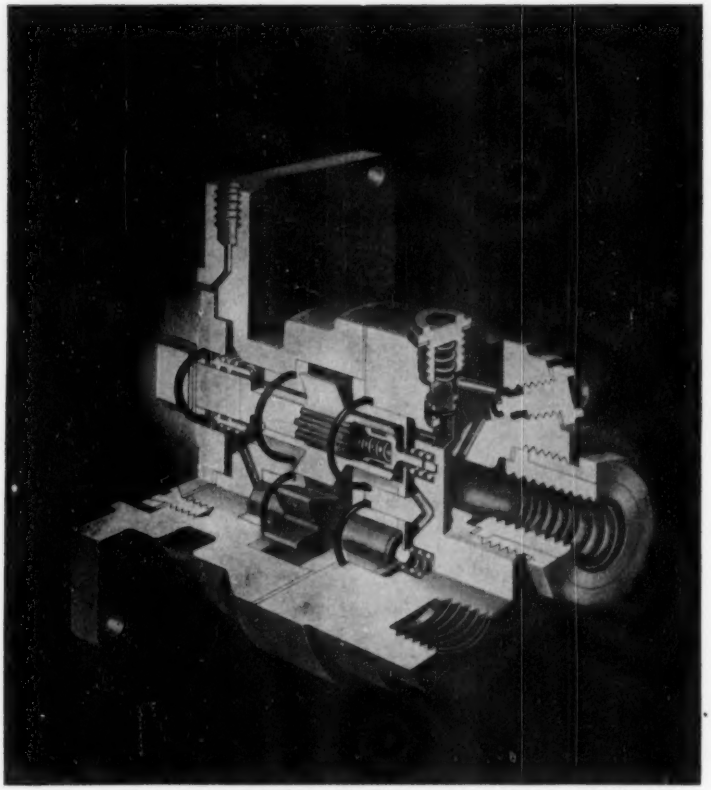
► **Airtron, Inc.**, Linden, N. J., has acquired a new plant with 23,000 sq. ft. of manufacturing space in Linden. Ground will be broken May 1 for a 13,000-sq. ft. addition to the new building.

► **The Austin Co.**, New York, has established a new headquarters for its Special Devices division in the Port of New York Authority Building at 76 Ninth Ave., New York 11. Firm makes electronic computers, control systems and similar devices.

► **Beckman & Whitney, Inc.**, San Carlos, Calif., instrument engineering concern, has established a Guided Missile Products division.

► **Boeing Airplane Co.**, Seattle, has awarded a $3,215,364 contract for con-





Cutaway view showing O-rings in Pesco hydraulic pump for aircraft and industrial applications.

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WITH PARKER O-RINGS

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PARKER is the one source for all standard O-rings to meet specifications covering fuel, hydraulic and engine oil services . . . and for special service O-rings of tested and approved compounds. Your Parker O-ring distributor listed at the right will give you Catalog 5100 . . . or write direct to The PARKER Appliance Company, 17325 Euclid Avenue, Cleveland 12, Ohio.

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DETROIT, Mich.
J. N. Fauver Co.
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Adco Industries
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Metal Goods Corp.
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INDIANAPOLIS, Ind.
F. H. Langsenkamp Co.
229 E. South St.

KANSAS CITY, Mo.
Metal Goods Corp.
1300 Burlington Ave. (16)

LOS ANGELES, Cal.
Aero Bolt & Screw Co., Inc.
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Inglewood, Calif.
Synthetic Rubber Products Co.
1538 South Eastern Ave. (22)

MIAMI, Fla.
Air Associates, Inc.
International Airport

MILWAUKEE, Wis.
Allrubber Products & Supply Co.
612 So. Second St. (4)

MINNEAPOLIS, Minn.
Van Dusen Aircraft Supplies, Inc.
2004 Lyndale Ave., South (5)

NEW ORLEANS, La.
Metal Goods Corp.
432 Julia St. (12)

NEW YORK, N. Y.
Durham Aircraft Service Co.
5615 Northern Blvd., Woodside, N. Y.
Nielsen Hydraulic Equipment, Inc.
298 Lafayette St. (12)

PHILADELPHIA, Pa.
Goodyear Supply Co.
1506 Latimer St.

PITTSBURGH, Pa.
Shields Rubber Co.
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PORTLAND, Ore.
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WICHITA, Kans.
Standard Products, Inc.
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CANADA
Railway & Power Engineering Corp., Ltd.
3745 St. James St., Montreal (30), Que.

struction of a five-story engineering office building having more than 225,000 sq. ft. of floor space.

▶ **Century Engineers, Inc.**, design engineers, has moved into a new 10,400-sq. ft. plant at 2741 North Naomi Ave., Burbank, Calif., and has built a 4,000-sq. ft. machine shop for pilot manufacturing, development and test.

▶ **Consolidated Vultee Aircraft Corp.**, San Diego, reports a $90-million backlog for 340 Convair-Liners, representing 140 aircraft. The company will expand its present payroll of 20,000. Convair has opened the first of a series of regional expediting offices in Newark, N. J., to insure on-schedule availability of critical parts and materials at reduced cost for all the company's divisions.

▶ **De Havilland Co.** is setting up a Ghost turbojet engine overhaul base at Bankstown, near Sydney, Australia, in anticipation of Series 1 DH Comet jet transports being put into service by Canadian Pacific Air Lines on the Sydney, Auckland, Fiji and Honolulu run next year. Military Ghost engines for DH Sea Venom fighters for the Royal Australian Navy will also be overhauled at the new base.

USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command.

Aeronca Mfg. Corp., Middletown, Ohio, assys. and sub assys., $38,000.

AiResearch Mfg. Co., 9851 Sepulveda Blvd., Los Angeles, compressor, gas turbine, $57,600.

American Chain & Cable Co., Inc., 601 Stephenson Bldg., Detroit 2, aircraft hardware, $91,000.

American Steel & Wire Co. of New Jersey, 3540 Le Veque-Lincoln Tower, Columbus 15, Ohio, aircraft hardware, $65,800.

Apex Machine & Tool Co., 1025 S. Patterson Blvd., Dayton, aircraft hardware, $76,675.

Ohio Valley Slate Co., 1936 Westwood Ave., Cincinnati, blackboards, $28,072.

Republic Aviation Corp., Farmingdale, L. I., N. Y., spares, exceeds $250,000.

Rice Stix, Inc., 1000 Washington Ave., St. Louis, Mo. shipping cases, $43,789.

Royal Heaters, Inc., 1024 Westminster Ave., Alhambra, Calif., fuel tanks, exceeds $250,000.

Ryan Industries, Inc., 19153 John R. St., Detroit, indicators, exceeds $250,000.

Schrillo Aero Tool Engineering Co., 8715 Melrose Ave., Los Angeles, thread gauges, 3,986 ea., $29,255.

Simmon Brothers, Inc., 30-28 Starr Ave., Long Island City, N. Y., printer projection, $97,349.

Son-Chief Electr., Inc., 41 Meadow St., Winsted, Conn., pitot tube, 2,277 ea., $30,284.

Sunbeam Corp., 5600 Roosevelt Rd., Chicago, machinery & equipment, $61,000.

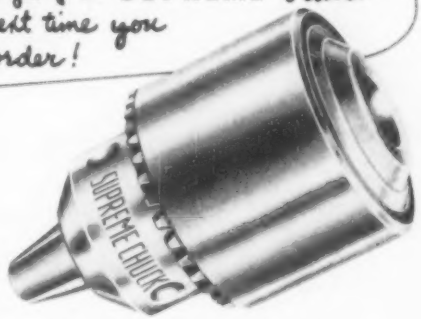
Standard Steel Works, 16th & Howell Sts., North Kansas City, Mo., refueling trailer, 275 ea., $56,787.

Thompson Products, Inc., 23555 Euclid Ave., Cleveland, maintenance parts, $100,787.

Experienced Shopmen say:

ONE LOOK AT A SUPREME BRAND CHUCK AND YOU KNOW IT'S QUALITY!

check these features by trying a SUPREME brand chuck the next time you order!



Entire chuck body is hardened inside and out.

Outer shell is smooth . . . an added safety feature.

Supreme brand chucks and keys are interchangeable with other makes.

Threaded nut and key driven gear are one piece.

Jaws are nickel chrome moly alloy steel, expertly heat treated and precision ground.

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SUPREME brand chucks are top quality chucks that are selected by particular workmen because of their long life and dependable performance. One look at the workmanship and you know that they have been made with care. The best of materials go into Supreme brand chucks and every chuck is carefully checked for accuracy before it leaves the factory . . . this gives you assurance that you can use them with confidence.

When you buy chucks for replacement specify SUPREME brand . . . or in buying new equipment tell your supplier you would like to have it equipped with SUPREME brand chucks.

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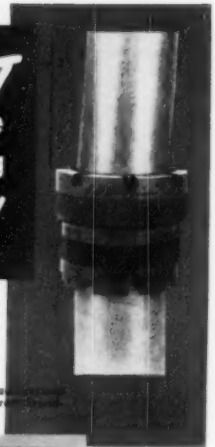
Supreme Products, Inc., 2222 South Calumet Avenue, Chicago, Illinois

THE CHUCK THAT LIVES UP TO ITS NAME...SUPREME

you can TILT this flexible fuel coupling WITHOUT LEAKAGE!



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This Rusco Belt is considered "Standard" for light planes. Other Rusco belts for every requirement. See your aircraft supply house or our nearest office.

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United Mfg. Co., New Haven, Conn., test stand, $26,537.

Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo., machinery & equipment, exceeds $250,000.

Westinghouse Electric Corp., 32 N. Main St., Dayton, alternators, regulators, exceeds $250,000.

Adel division, General Metals Corp., 10,777 Van Owen St., Burbank, Calif., valve parts, $52,000.

Advertising Displays, 419-423 Pike St., Covington, Ky., kits, $90,297.

Aero Instrument Co., 5165 Denison Ave., Cleveland, tube, pitot, 3,521 ea., $41,547.

Aeroproducts, General Motors Corp., Dayton, propeller cone, 7,482 ea., $44,517.

Aircraft Fitting Co., 1490 E. 30th St., Cleveland, aircraft hardware, $44,137.

Aircraft Hardware Co., Inc., 810 Edgewater Rd., New York, aircraft hardware, $43,650.

AiResearch Manufacturing Co., div. of The Garrett Corp., Los Angeles, actuator parts, $110,494.

Airtron, Inc., 101 E. Elizabeth, Linden, N. J., disconnect ground, $56,019.

All American Airways, Inc., Engineering & Research division, Wilmington, Del., personnel pick-up systems, $55,505.

Allison division, General Motors Corp., Indianapolis, spare parts, exceeds $250,000; engines, exceeds $250,000.

Behr Manning Corp., Troy, N. Y., hardware, $58,749.

Boots Aircraft Nut Corp., 50 John St., Stamford, Conn., aircraft nuts, $33,606.

The Deutsch Co., 7000 Avalon Blvd., Los Angeles 3, aircraft nuts, $76,950.

Dial Screw Products Co., Inc., Woodside, N. Y., aircraft bolts, $36,243.

Dumont Aviation Associates, 1401 Freeman Ave., Long Beach, Calif., aircraft nuts, $32,762.

Farbach Chemical Co., Chase & Dane Sts., Cincinnati, methylene chloride and naphtha, $32,902.

Fletcher Aviation Corp., 190 W. Colorado St., Pasadena, Calif., tank assy., exceeds $250,000.

S. Frechlich Co., Inc., 1225 Broadway, New York, belt, lap safety, $29,820.

Hobbs Manufacturing Co., 26 Salisbury Street, Worcester, Mass., hardware, $152,417.

Jack & Heintz Inc., Cleveland 1, spare parts, $31,596.

Macwhyte Co., 2906-14th Ave., Kenosha, Wis., aircraft hardware, $117,000.

Mason Silk Co., 25 E. 26th Street, New York, thread, nylon, $78,742.

New Departure div., GMC, Bristol, Conn., bearing, ball, $32,709.

Operating & Maint. Specialties, 324 S. Trade St., Rock Hill, S. C., aircraft hardware, $28,500.

Sun Chemical Corp., Rutherford Machinery Co., 10th St. & 44th Ave., Long Island City, N. Y., press proving, $38,720.

Van Norman Co., 3640 Main St., Springfield, Mass., grinder, 10 ea., $65,205.

Marquette Metal Products Co., 1145 Galewood Dr., Cleveland, windshield wiper assy., $63,616.

Montague-Harris & Co., 1075 Folsom St., San Francisco, punch, turret, 146 ea., $68,587.

National Co., Inc., 61 Sherman St., Malden, Mass., radio receivers, 70 ea., $32,482.

New Departure div., General Motors Corp., Bristol, Conn., ball bearings, $78,760.

North American Aviation, Inc., Los Angeles International Airport, Los Angeles, aircraft, exceeds $250,000.

Pratt & Whitney Aircraft div., United Aircraft Corp., East Hartford, cutaway engines, exceeds $250,000.

Reading Battery Co., Reading, batteries, 3,550 ea., $126,699.

Shenango-Agaloy Tube Co., 905 Wheel St., Springfield, Ohio, steel tubing, 41,190 ft., $27,557.

Synero Machine Co., 611 Sayre Ave., Perth Amboy, N. J., helicopter clutches, $81,000.

Thompson Products, Inc., 23555 Euclid Ave., Cleveland, machinery and equipment, $186,500.

Timken Roller Bearing Co., Canton, Ohio, bearings, 25,000 ea., $33,250.

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You're right if you tagged it as a frame for a midget racer. And, chances are, you know metal fabrication and talk the same language as the men of Harter who made this little car as a hobby. Perhaps the most interesting fact about this car is that in a few days it progressed from a mere doodle on a designer's pad to actual production. This is typical of the ability of the Harter organization to translate quickly an idea into a finished product. This quality makes Harter a splendid subcontractor when you need help *fast* to make promised delivery on defense contracts.

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AVIATION PRODUCTS

CLOSE LIAISON between the carrier's pilots and mechanics is one aspect of . . .

Colonial's 'Personal' Path to Safety

The men get to know each plane's peculiarities because the same shop crew always works on the same ship.

By George L. Christian

Nearly 22 consecutive years of scheduled operation without a fatal accident or serious injury to passenger or crew member is the enviable record rung up by Colonial Airlines.

A glance at Colonial's impressive safety history shows that the airline, in its first 21 years, flew 458,603,855 passenger miles, completed 522,294 landings and takeoffs. It carried over 1,447,227 passengers safely over its routes of 3,182 miles, stretching from Washington National Airport and LaGuardia Field in the U.S. to Montreal and Ottawa in Canada. (In addition, Colonial has a southeast link to Bermuda, added after the war.)

► **Personal Touch**—T. E. Volz, director of maintenance and overhaul at Colonial's LaGuardia Field base, says a major factor contributing to Colonial's unblemished record is the "personalized interest and contact" his mechanics have with the airline's fleet of eight DC-3s and four DC-4s.

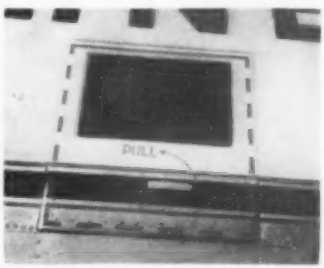
Because of Colonial's schedules and route structure, no aircraft is away from home base for more than 48 hours. So the "boys" know each plane's idiosyncrasies and give each the personalized treatment necessary for flawless maintenance. The same group of men always work on the same planes, so they become completely familiar with other ships.

► **Cockpit-Shop Liaison**—Another reason for the airline's safety record, according to Volz, is the close liaison between the pilots in the cockpit and the mechanics in the shop. If a pilot has an unusual squawk, he feels free not only to write it up, but to go to the maintenance foreman and discuss it with him personally.

By the same token, if a foreman does not fully understand a squawk written up by a pilot, he calls the pilot and asks for a fuller or clearer description of the trouble. Such close liaison cannot help but promote better maintained aircraft, Volz feels. And it is good for employe morale.

A procedure that helps to cement the pilot-mechanic relationship is the direct radio contact pilots often have with the maintenance department in case trouble develops while the craft is airborne and the pilot is uncertain what corrective measures to take.

As Volz puts it: "They feel less alone up there when they get into trouble." He cites an example of a recent Colonial DC-4, under charter to Eastern Air Lines, whose nose gear would not come down when the ship came in for a landing. The pilot got in contact with both maintenance and operations personnel at New York. Quick calculating showed that the pilot could bring the plane in on main gear and tail with the load he was carrying. He was told how many passengers to move to the rear of the plane. The captain was able to make a perfect landing without injury to passengers or crew and with negligible damage to the plane.



EMERGENCY EXIT on Colonial DC-4 may be opened from inside or outside.

► **Around the Shop**—Colonial has developed for its DC-3s a long-needed emergency exit that opens from the outside as well as from inside. The two handles are on a common shaft, manufactured by Colonial. The modification is easy to perform, costs little and could conceivably be instrumental in saving a plane-load of passengers. Colonial has painted red lines around the outside of the exit, an arrow indicating direction of rotation of the handle, and in large red letters, the word "Push."

Colonial has installed the outside handles on one DC-3, is in the process of modifying its entire fleet. The company's DC-4s will get the same treatment. The exterior lettering reads "Pull" because the emergency doors open out on the DC-4.

► **Wind-Brake**—Spoilers for airplane wings to keep planes from going on unscheduled "flights" when tied down during strong windstorms are nothing new on the horizon of aviation. But they have gradually fallen into disuse as planes have gotten bigger and heavier.

The DC-3, however, is light enough to be tossed up by hurricane winds. So Colonial puts spoilers on the ships' wings in the face of heavy blasts. Volz cited one case where one of his company's DC-3s was kept firmly on the ground by use of the spoilers (installation takes a few minutes) although the wind was blowing so hard the propellers were windmilling.

► **Gas Gripe**—Colonial, along with most airlines, is unhappy about the increase of lead content in aviation fuel, according to airline officials. One of the results of increased lead is a reduction in spark plug life. Officials say plug change has dropped from 275 hr. summer, 200 hr. winter, to 200 hr. summer, 150 hr. winter. And cabin heaters are fouling more rapidly.

► **Shop Work**—Colonial has several projects going in its shop. They include:

- Replacing the top six cylinders of the R-2000-11 engine with —13 cylinders having the muff-type barrel. Better cooling and increased piston life are expected.
- Change from hand-spliced control

cable wherever possible to swage-type. This has reduced time to cable a DC-3 by over 60%.

• Hand operated, dry cell-powered flash lights are installed in the carrier's DC-4s in case an emergency, such as ditching, knocks out the ship's main electrical system. The lights illuminate both ends of the main cabin and the life raft stowage compartment.

• Fill and drain method is being used to strip fuel tanks on a DC-4, currently undergoing a 9,000-hr. inspection in Colonial's hangars. Wyndotte #2304 tank desealant is being used with excellent results, say CAI spokesmen. (Interesting sidelight is a safety precaution taken by safety-conscious Colonial. The first 12 feet of wire of the explosion-proof trouble lights used to inspect inside of the tanks is covered with heavy rubber hose. This gives positive insurance against cutting through the wire's insulation on sharp edges of the wing. A short could—and has—proved fatal.)

► **Polished Props**—The carrier now polishes the forward face of its propellers.

Airline officials say this eases keeping the blades clean and neat looking. On DC-4s, the pilots report that they can tell that the landing gear is down by reflections cast on the highly polished blades—a novel twist.

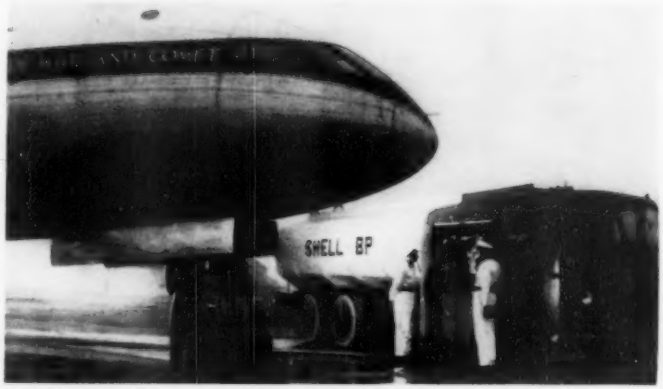
► **DC-4 Changes**—An experiment is being tried on the DC-4 currently undergoing overhaul. The plywood flooring is being removed and replaced with roofing paper and sponge rubber-backed Duracoat flooring material. Weight saving of 250-300 lb. is expected.

At the same time, stainless steel floor coverings are being installed in the galley and toilet to combat corrosion.

Cabin heater controls are being moved from the forward baggage area to a panel above the co-pilot's head so that he may have complete control at all times without leaving his seat. Also, manually operated fuel shut-off valves are being installed as close to the heaters as possible. These permit shutting the heaters down in case of failure of the electrically controlled valves. One valve is by the co-pilot's right foot, the other by the door leading to the cabin.

DC-4s carry Loran navigation equipment. "Victory Girl" emergency radio transmitter are carried on in Colonial's life rafts (which broadcast on dual frequencies—500 kc. and 8280 kc.). Emergency calls are put out on each frequency alternately.

Two of each three life rafts carried in the DC-4s are also equipped with pint-sized radio transmitters and receivers. The VHF handi-talkies transmit on 121.5 mc. and have an average range of 15-30 mi. Sets measure 15¼ in. long x 2¾ in. in dia. Weight is 2.11 lb., plus another 2.5 lb for a new Mallory mercury-type battery. The battery gives the set a lift of about 25 hr.



SHELL REFUELER will tank up the de Havilland Comet in under a half-hour.

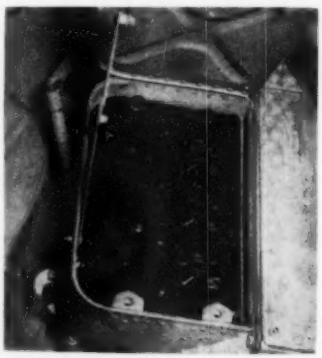
New Tanker Fleet to Service Jets

Shell Petroleum Co., Ltd., will spot 60 of its Dorset tankers along BOAC's routes to speed Comet refueling.

With the Comet expected in May to go into scheduled service on British Overseas Airways trunk routes, Shell Petroleum Co., Ltd., in contract with the carrier, is taking delivery of 60 refueling trucks specially tailored to meet rapid servicing needs of the speedy jet airliner.

Built in collaboration with Shell by Thompson Bros., Ltd., Bilston, the tankers are being spaced at main refueling points along BOAC's routes to Singapore and Johannesburg, already pioneered by the company in experimental runs with the Comet.

With a good English name, the "Dorset," the truck carries 3,600 U. S. gal., delivers it at a top rate of 250 gpm. through a single hose fitted for underwing refueling. Trials indicate two of these units under normal conditions can tank up the Comet in well under a half hour, including time taken for coupling the hoses to the plane. Early Series I Comets have a capacity of 7,236 U. S. gal., while that for later Series 2 is being upped to about 8,400 U. S. gal. This compares to about 7,800 gal. carried by the Boeing Stratocruiser.



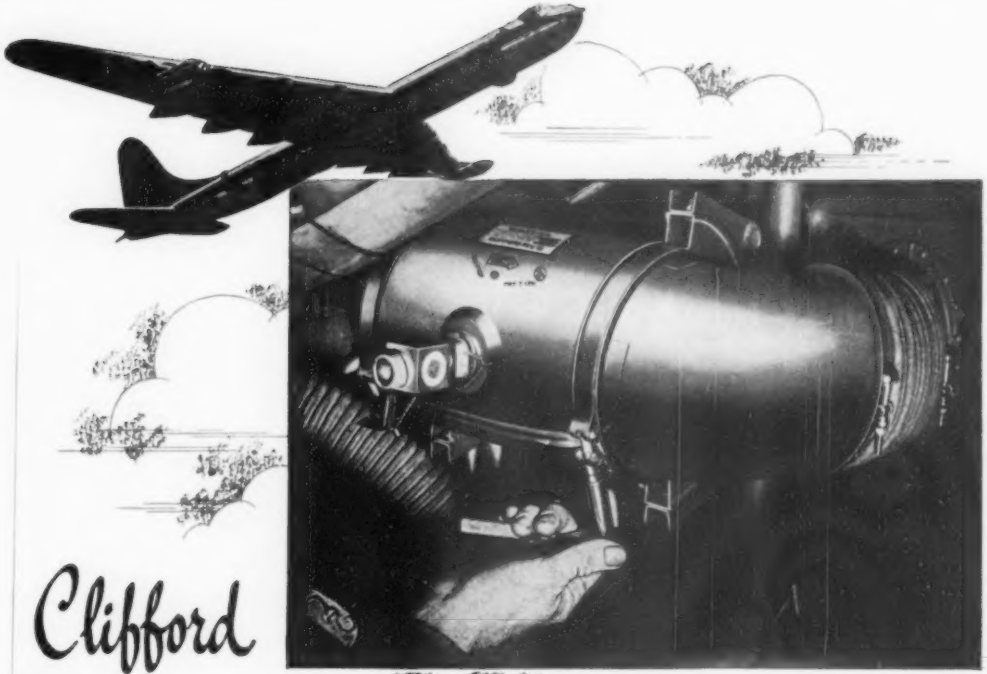
REFUELING PANELS are located in port and starboard wheel-wells of Comet.

► **Fast Flow**—Capacity of the Dorset is about average, its 3,600 gal. comparing to 1,800 to around 5,000 gal. carried in other trucks. But its delivery rate of 250 gpm., compared to a maximum 200 gpm. for commercial trucks in general use here, is high. (While it can deliver fuel at a faster rate to a single point, some truck models recently introduced can, as single units, deliver more fuel. They carry two hoses, delivering together as much as 400 gpm. Two Dorsets can exceed this by only 100 gpm.)

Still, the new jet servicer's high single-hose delivery rate at least can be utilized to the full in underwing refueling. "Blow-back" and excessive foaming from too rapid delivery in overwing fueling often requires that hose output be reduced well below its maximum to prevent such occurrences.

► **U. S. Systems**—While already extensively used by the U. S. Air Force, the only commercial planes carrying underwing refueling as standard equipment are Martin 2-0-2As and 4-0-4s operated by Trans World Airlines, Eastern Airlines 4-0-4s and formerly by Northwest Airlines 2-0-2s now leased out.

Northwest also employs the system in its Stratocruisers, although it is not standard in this craft. Some advantages cited for underwing refueling are: faster permissible delivery rates; improved accessibility making for faster hookup,



Clifford Feather Weights Cool the Oil in

WORLD'S LARGEST BOMBER, the Convair B-36D, has a 10,000 mile range and a ceiling of over 45,000 feet.

It uses a Clifford oil cooler to get rid of the heat generated in the constant speed drive which links the engine to the 400 cycle alternator. The oil cooler is essential to the proper operation of the unit under the varying conditions of takeoff and flight, and permits the use of a smaller size and lower weight drive.

CONVAIR B-36D BOMBERS

Conventional or jet powered, civilian airliner or world's largest bomber . . . all types of modern aircraft depend on Clifford Feather Weight All-Aluminum Oil Coolers . . . *the only all-brazed type* of oil coolers. Their superior weight-strength ratio is achieved through Clifford's patented brazing method and pre-testing in Clifford's wind tunnel laboratory . . . the largest and most modern in the aeronautical heat exchanger industry. For further details, write Clifford Manufacturing Company, 136 Grove Street, Waltham 54, Mass. *Division of Standard-Thomson Corporation.* Sales offices in New York 17, Detroit, Chicago 1, Los Angeles.

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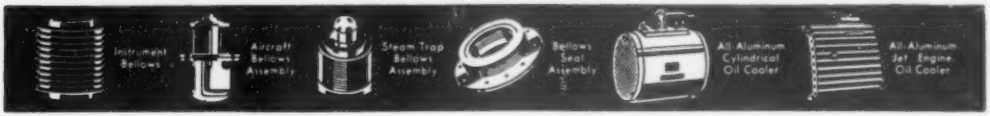
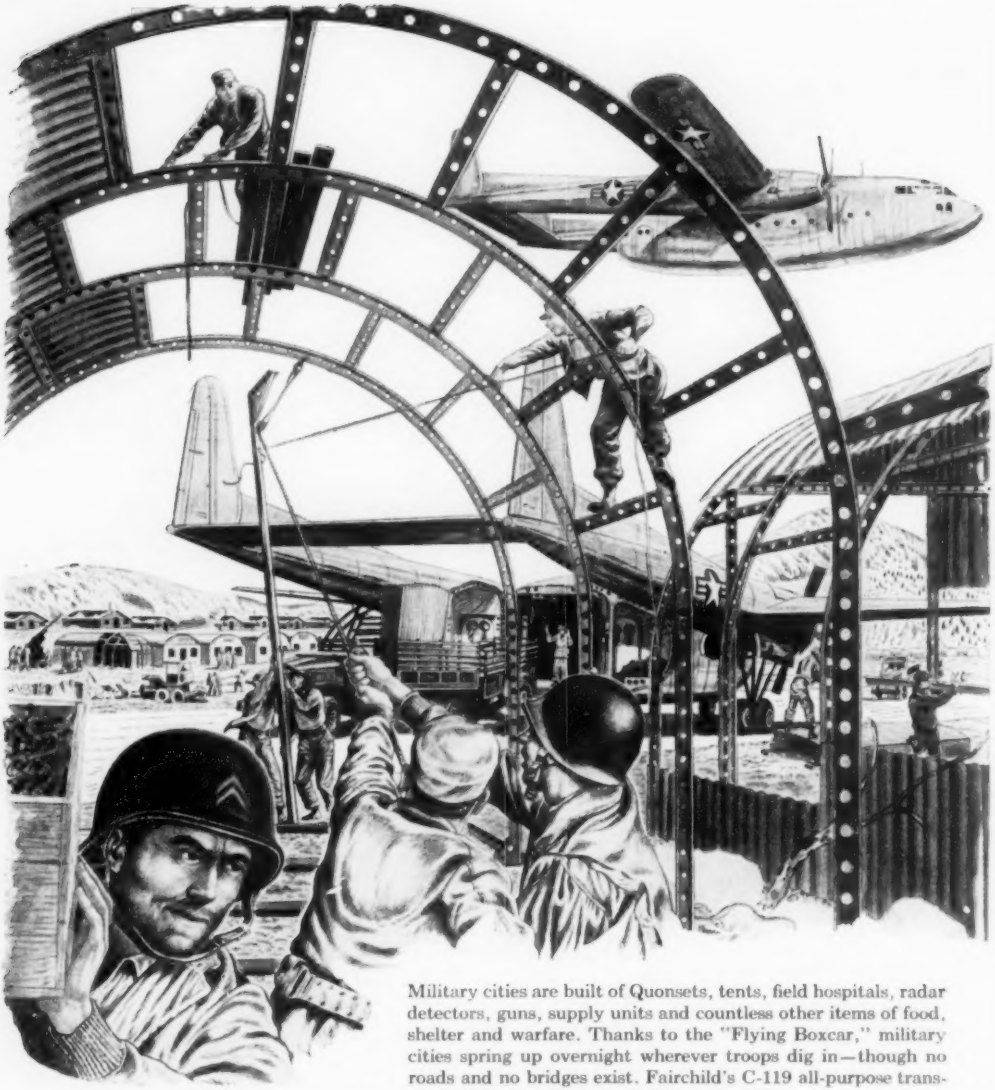
AND BELLOWS ASSEMBLIES





Military cities are built of Quonsets, tents, field hospitals, radar detectors, guns, supply units and countless other items of food, shelter and warfare. Thanks to the "Flying Boxcar," military cities spring up overnight wherever troops dig in—though no roads and no bridges exist. Fairchild's C-119 all-purpose transport *delivers* anything needed from the air!

CITIES THAT ARE *Built in a Day*

Speed, stamina, versatility—the "Flying Boxcar" has demonstrated them all over tough battle-torn Korea. Backbone of the airlift, the Fairchild C-119 is number one all-purpose transport for military operations of UN forces in Korea, in Europe and in the United States.

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FAIRCHILD *Aircraft Division*

Hagerstown, Md

Other Divisions: Engine, Guided Missiles and Stratos Divisions, Farmingdale, N. Y.

FUEL CONTENT of Comet tank is read directly off lowered drop stick.

UNDERWING REFUELING points on the jet are easily reached from ground.

and less chance of damaging wings.

But while underwing refueling is growing in favor, the Dorset's designers didn't forget that most aircraft around still are the overwing type. The refueler is built to handle both systems. Fuel is supplied by a single, high capacity centrifugal pump driven by a takeoff on the vehicle's engine. The truck can draw fuel from an outside source to replenish its own supply while continuing to deliver to the plane, and it can pump in reverse to off-load or defuel planes. All controls and gages are conveniently combined on a single panel, simplifying the operator's task.

►**Comet System**—The Comet is refueled at two points, through standard SBAC Lockheed Avery screw-type couplings, located just outboard of each wheel well and less than six feet off the ground. Fuel is directed to five tanks, a main one in the center section under the fuselage, two inboard and two outboard wing tanks. Each is equipped with float-operated cut-off switches that automatically close the refueling valve when fuel reaches a certain level. If the system fails and tanks overfill, a blow-off relief valve serves as back-stop.

In each wheel well is a control panel containing for each tank dial contents gages, red warning lights, and three-positioned switches marked "Refuel," "Off," and "Off-Load." A master refuel switch is located under the belly of the plane.

The refueling switches are held magnetically until the fluid level is high enough to actuate the float-operated cut-off switches. This point is about 100 gal. short of full capacity; then the red warning comes on, control switches go off and tank refueling valves close. To top off tanks, pumping is reduced to 50 gpm., and control switches are manually held to "refuel" until the red lights come on again. When tanks don't have to be filled to normal loads, supply can be cut off any time by manually overriding the control switches.

While fuel quantity can be read off gages in the wheel wells, a direct check is provided by a "drip-stick." This is a sliding tube fitted to the base of each tank which can be pulled out. As the tube is withdrawn and the open top

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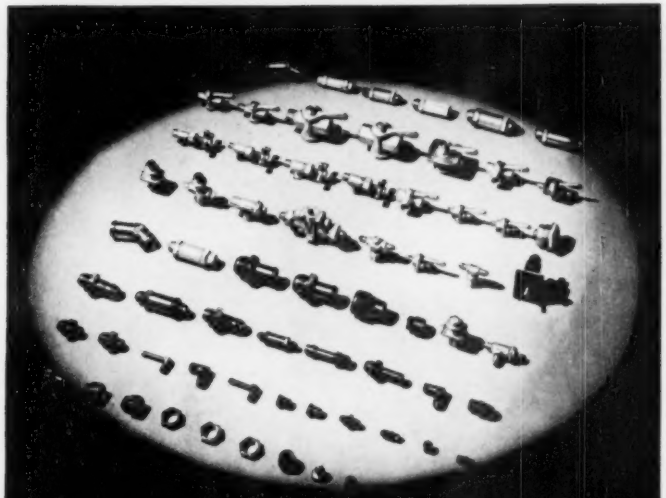

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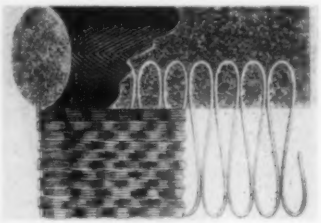
comes down to the level of the fuel in the tank, the fuel flows into the tube and drips from the bottom end. By means of a graduated scale on the stick, the amount it is withdrawn when this tell-tale appears gives a direct reading of contents.



Sponge Sealer

Sponge rubber weather stripping and gasket material with a patented internal steel wire reinforcement is gaining favor in aviation circles.

Grumman Aircraft Engineering Corp. engineers state that the material, named Inner-Seal, has given excellent results for the last four years in Grumman amphibians where it is used to seal bulkhead doors.

Desirable features enumerated by Grumman are:

• **Hermetic sealing** of the sponge rubber core by a durable Neoprene cover or "skin." Result is that when Inner-Seal is compressed, air bubbles in the rubber honeycomb are trapped in the airtight seal and cannot escape. When pressure on the seal is relieved, air seeps back into the expanded cells, combating the tendency of rubber to set in the compressed shape. Life of the seal is considerably prolonged.

• **High-tensile strength** spring steel wire, looping through both flange and rubber bead, gives the seal resilient rigidity and also contributes materially to long life.

• **Neoprene skin** is impervious to gas, oil and other fluids normally used in and around the aircraft.

▶ **How It Is Made**—The live sponge rubber bead is moulded into a wire fabric cloth flange. The sponge rubber is cured onto the wire, the rubber flowing through the wire loops which act as continuous anchors. A vulcanized bond is also obtained between the sponge rubber and wire cloth.

The seal is covered with rubber cement, then with rubber latex. The standard product is covered with Neoprene and is available in several colors and with several thicknesses of latex deposits.

A heavy-duty version of the product uses a thick latex jacket vulcanized to the core.

The warp of the flange can be any material specified by the purchaser—

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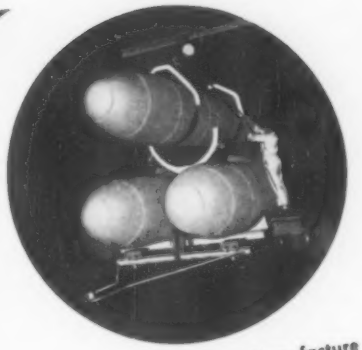

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Ryan activities bracket many fields ranging from development of subminiature electronic equipment to manufacture of huge external fuel tanks and fuselage sections . . . from executive-liaison planes to high-speed pilotless jet aircraft and new applications of jet propulsion.

RYAN AERONAUTICAL COMPANY
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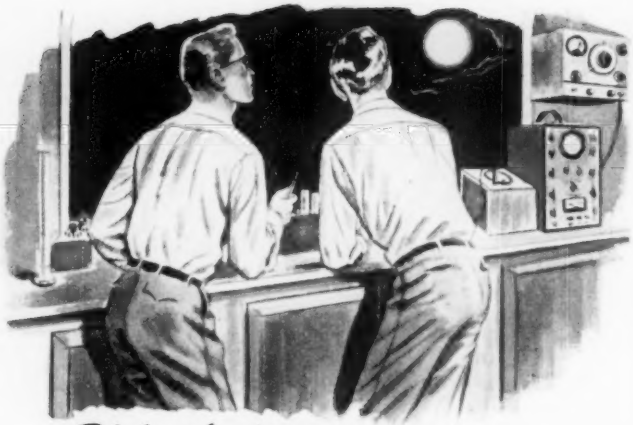

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● With man's mastery of the air one wonders if there's any reasonable limit to the advance of science... with broad horizons, we at Schuttig combine electronic engineering skill with vision and understanding... our products reflect quality and design superiority. We can probably help you with your designs or production.

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paper, fibre, nylon etc.

The manufacturer claims Inner-Seal is flexible enough to conform to the most irregular surfaces, and can be bent through 180-deg. arc without wrinkling. The bead can be set at any desirable angle to the flange.

The slight amount of rigidity furnished by wire innards is said to speed installation, and with the tough Neoprene coating gives great durability. The price is reported to be competitive with other weather stripping and gasket materials.

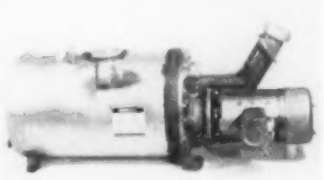
Airframe manufacturers using Inner-Seal, according to the maker, are Convair, Martin and Republic, in addition to Grumman.

Exclusive agent is Donald H. Horsey, Inner-Seal division, Bridgeport Fabrics, Inc., 320 Fifth Ave., New York, N. Y.

B-36 Panel Lights

Individual "ring" lighting, rather than general lighting of the entire panel, is being used to illuminate instruments in the B-36, General Electric reports.

Two bulbs per instrument are used. GE has adapted its No. 327 miniature bulbs for the job. These have a diameter of ¼ in. and a length of ⅝ in. They are inserted in red plastic holders at the top of each instrument and produce a red light through filters. This has been found best for dark adaptations of the eyes.



HYDRAULIC POWER-PACK

This self-contained hydraulic power pack provides "maximum efficiency with minimum weight," according to the manufacturer, Dowty Equipment Ltd., of Cheltenham, England. The unit illustrated will go into the Airspeed Ambassador; similar package will be supplied for Saunders-Roe's giant Princess flying boat. The Ambassador's unit mounts a 5-hp. variable speed electric motor driving a radial pump of 80% efficiency at maximum speed and pressure. Delivery is 0.43 gal. per 1,000 rpm. at zero pressure. Working pressures are 2,000—2,800 psi., max. pressure is 3,000 psi. Normal speed range is 4,500—6,250 rpm. and max. rpm. is 7,000 under no load conditions. Dimensions are 29¼ in. x 10¼ x 12 in. Idle running and resultant unnecessary wear are eliminated by automatic control of the motor through a pressure switch.

. . . YET SCRAP INVENTORIES ARE ALARMINGLY LOW. *YOU* ARE BEING COUNTED ON TO HELP KEEP THE FURNACES WORKING . . . TO AID DEFENSE

With our increased steel production, the furnaces are gobbling up an enormous amount of iron and steel scrap.

More—far more—scrap than is at present going into their scrap stockpiles.

Many mills are operating on a hand-to-mouth basis. Some are already threatened with shut-down—for lack of scrap.

The Danger Is Increasing

Will efforts to fill the tremendous demands for steel fail because of lack of scrap?

Steel is made from 50% scrap. We could be severely handicapped—in our aim to keep abreast of both military and civilian requirements—if scrap suppliers can't keep pace with productive capacity.

But they *can* keep pace . . . with your help!

Enough Scrap IS Available!

Yes—the only problem is to get the available extra scrap from where it is—to where it's needed.

Where is it?

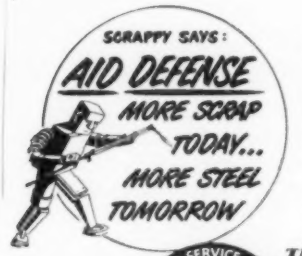
In *your* business . . . in the form of old machines and equipment, tools, implements, dies, jigs, fixtures, outmoded structures, chains, valves, wheels, pulleys—any old iron and steel that's rusting away.

Six Million EXTRA Tons Needed!

By the end of 1952, we'll be producing steel at an annual rate of 20 million tons more than in 1950. That means we will need at least 6 million more tons of scrap than we've ever needed before.

It's up to you. Write at once to Advertising Council, 25 W 45 St., New York 19, N. Y., for a free copy of "Top Management: Your Program For Emergency Scrap Recovery".

Please write today—there's not a day to lose.



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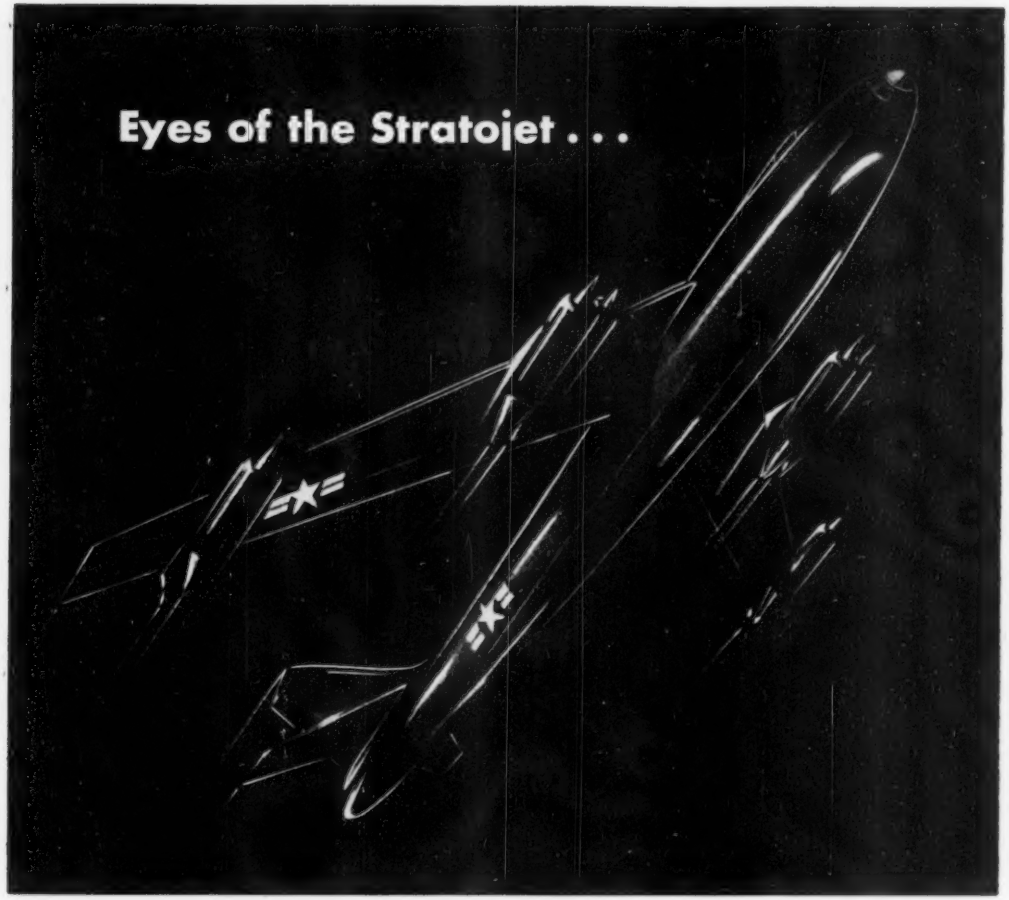
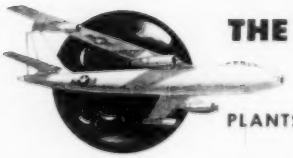


Protected by radomes made by Brunswick

A wide range of aircraft components employing low-pressure polyester laminates, as well as metal aircraft sub assemblies, are now in production at Brunswick's midwestern, southern and Canadian plants . . . among them radomes for the B-47 Stratojet and other military aircraft. Brunswick's engineering and production skills also are at work for such famous names as Boeing, Lockheed, Beech, Douglas, Republic, McDonnell, Cessna and Avro in the manufacture of complete empennage assemblies, fin and rudder tips, nose and tail cones. To put these same facilities to work for you, write:



THE BRUNSWICK-BALKE-COLLENDER COMPANY

623 SOUTH WABASH AVENUE, CHICAGO 5, ILLINOIS

PLANTS: MUSKEGON, MICHIGAN; MARION, VIRGINIA; TORONTO, CANADA

NEW AVIATION PRODUCTS

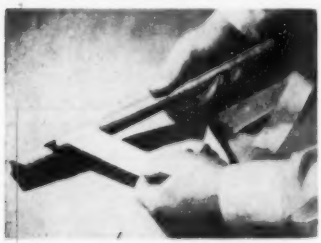
Fuel Switch

A fuel pressure differential switch, meeting Northrop Aircraft, Inc. specifications, has been placed on the equipment counter by Missile-Aircraft Engineering Co.

Already in production, the switch conforms to Northrop drawing D 7-S-210 and is built in accordance with applicable AN specifications, says C. B. Lonon, chief engineer and partner in Missile-Aircraft.

The switch is suitable for operation at any pressure up to 40 psi. Pressure drop giving 2½ psi. differential causes the switch to actuate an electrical circuit. At the opposite end of the scale, when pressure rises for a differential of 3½ psi., switch also comes into operation. The part is designed for use with 28 v. d.c. aircraft electrical systems.

Missile-Aircraft Engineering Co., 122 E. Orange Grove Ave., Burbank, Calif.



Hot Tape for Tubes

Latest heating medium developed by Electrofilm Corp. comes in what looks like ordinary tape, but consists of heating elements that can be wrapped, much as you would wrap insulation tape, around cylinders and tubes to provide warmth up to 300F.

The flexible tapes dissipate 2.5 watts sq. in., provide one-in. wide heating surface out of the 1½-in. total width of the tape. Types are provided for operation both on 115 v. a.c. and 27 v. d.c. electrical current. The latter is furnished both in 28 in. and 10 ft. lengths, the former only in 10-ft. length. A 10-ft. tape costs $9.85; price for the 28-in. tape is $4.85.

Electrofilm Corp., 7116 Laurel Canyon Blvd., N. Hollywood, Calif.

Drill for Plastics

A new highspeed drill for working plastic materials has been developed by Westinghouse Electric Corp., Pittsburgh.

The drill has a straight round shaft, rather than a spiral-groove found in conventional types. It will penetrate a thick plastic section like "a hot knife passing through butter," while ordinary drills must be fed slowly to prevent overheating, Westinghouse claims. The new part not only is faster but lasts longer, says the company.

Shaft of the new drill is only 40% the diameter of the drill tip. To permit better chip flow and reduce friction the drill tip is notched so that chips are chopped into small particles.

Coating for Runways

A new plasticized synthetic rubber and tar blend to protect airport runways and taxi strips from jet fuel spillage has been announced by the Naugatuck Chemical division of the United States Rubber Co.

The material, called "Surfa-Acro-Sealz," is scheduled to be service tested this month along with similar products at Hunter AFB, Savannah, Ga., according to the firm. The product will be applied to a 900-ft. section of runway and a taxi strip.

U. S. Rubber believes the material is an economical answer to the problem of preventing disintegration of runways from kerosene fuels spilled by jet planes. Kerosene has a tendency to dissolve asphaltic cement pavements. Fuel spillage, from topped off tanks, generally occurs on the parking stands, taxi strips and the first 500 ft. of runway, the company points out.

Before application, Surfa-Acro Sealz first is mixed with selected tar cement in the hot melt phase, then shipped to the site in drums, tank cars, etc., where it is mixed with aggregate by a regular hot mix plant procedure.

To provide protection for existing asphaltic cement pavements, a coating of 1 to 1½ in. of this blend is laid with regular paving equipment, then rolled and compacted. Or in new construction, the material can be combined economically with asphaltic concrete.

The blend is said to be unaffected

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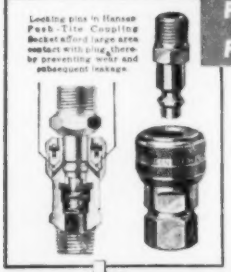
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United States Rubber Co., Rockefeller Center, New York 20, N. Y.

VHF Transmitter

A new 18-channel VHF transmitter with a five-watt output has been developed for use in executive, commercial and military craft by Lear, Inc.

The transmitter meets all ATC and military requirements regarding reliability and performance, says Lear. It can be operated on 12 or 24-v. d.c. systems. While a powerful five-watt, 100% modulated unit, it weighs only 10 lb., including a self-contained power supply; sells for less than $400 minus accessories and crystals.

In addition, it provides a 7½-watt power amplifier for the cockpit speaker to boost the output level of aircraft receivers which normally have only enough volume and power to operate headphones. When not being used as a transmitter, the modulator can function as a booster amplifier for the speaker.

Also, simply by pushing a button, the pilot can tune his receiver to the same frequency he has selected on the transmitter. This eliminates the necessity for asking for a count from the tower, avoiding considerable confusion and delay for aircraft not equipped with crystal-controlled receivers, Lear states.

For operation on frequencies within the range from 118.1 and 126.7 mc., the transmitter is designed to enable the average executive and personal plane pilot to cope with traffic requirements around high-density airports. The 18 frequencies are selected by remote control through a switch on the instrument panel.

Learcal division, Lear, Inc., Los Angeles.

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Tough, flexible ducting for vacuum and pressure services is strong but lightweight, made of Neoprene compounds, laminated nylon chafer duck, then wire-reinforced; can be used for collecting abrasive dust or where hose must undergo heavy flexing. American Ventilating Hose Co., 100 Park Ave., New York 17.

Electric tractor for materials handling, heavy-duty Model A-800-4, is powered by two high-capacity electric motors capable of delivering 800-lb. normal and 5,500-lb. maximum drawbar pull. Has four-wheel drive and four-wheel steering unit controlled by automotive type steering assembly and foot pedal. Mercury Mfg. Co., 4044 S. Halstead St., Chicago 9, Ill.

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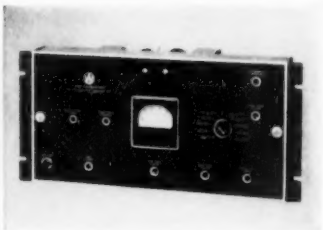

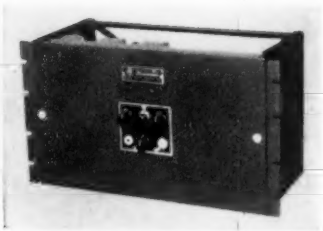

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Write Today for complete information and specifications on the Wilcox Type 408A Transmitter and the Type 305A Receiver.

Higher Fares Needed Now, Say Airlines

- **$1-a-ticket hike, end to roundtrip rebate asked.**
- **But CAB rate men see no need for increase now.**

In the next 15 days a majority of the five-man Civil Acronautics Board will decide whether or not to allow the airlines to hike air fares about 6%, effective Apr. 16 for some lines, Apr. 27 for others. The price increase proposed by most of the U.S. domestic trunk airlines is a straight $1 raise on one-way tickets and elimination of the traditional 5% discount on roundtrips.

The Board's top staff officials on rates are advocating suspension of the proposed fare increases, at least until a compelling need for the raise is proved by the airlines.

Because of the importance of the decision, AVIATION WEEK reports here detailed arguments of American, Eastern and United—the first three lines to send CAB their "justifications" advocating higher fares—and the counter arguments given by CAB's rate-making officials.

▶ **Speaking for Industry**—American Airlines acts as spokesman for the industry, which American has led into the current price-rise campaign.

Highlights of American's memo to CAB:

• **Low fares risky, costly.** Fares are far lower today than they were in 1940, in terms of purchasing power. But "such an achievement was not without risks and cost," American says.

For the three years 1946-48, domestic trunklines' operating loss alone totaled $50 million. For the years 1946-51 the return on investment of the Big Four lines, after taxes, was only 4½%. American's was 4.7%. This leaves "no significant reserves to cushion it against future economic shocks."

• **Pricing not CAB's job.** "The Board cannot make management decisions . . ."

Where the question is only one of sound business judgment, the decision should be left up to private management, American says.

• **Discount no CAB concern.** "The elimination of a roundtrip discount is a minor adjustment of no possible concern to the regulatory agency."

"The freedom of management to provide or withhold such discounts, and to vary them in amounts when they are given, is illustrated by the diversity found in the long-regulated surface transportation field," adds American. The company says the discount is "a promotional device altogether, given or withheld . . . as the salesman's 'hunch' indicates."

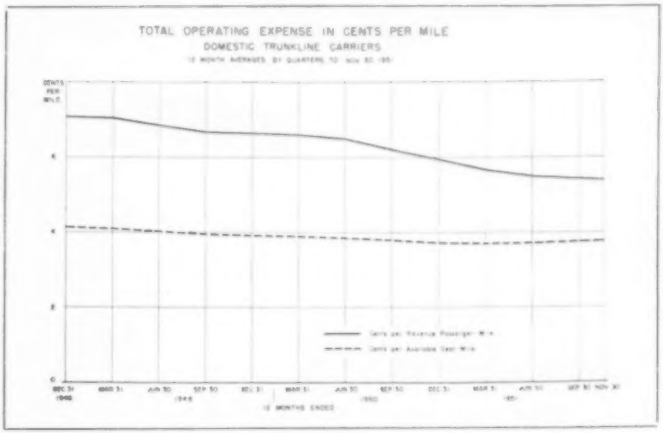
American estimates the elimination of the discount would have added $3,146,025 to revenues last year if one could assume that the discount did not influence anybody to buy or hold onto a roundtrip by air. The offsetting cost-saving to American in ticketing roundtrippers is about $205,000.

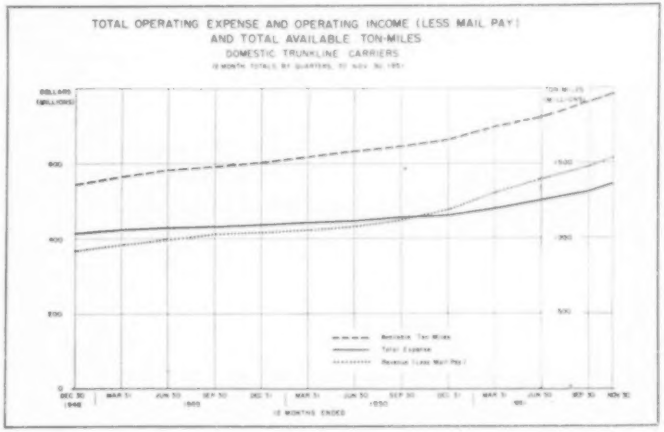
"As a promotional device, the 5% discount is so small that its value is nil," says AA now.

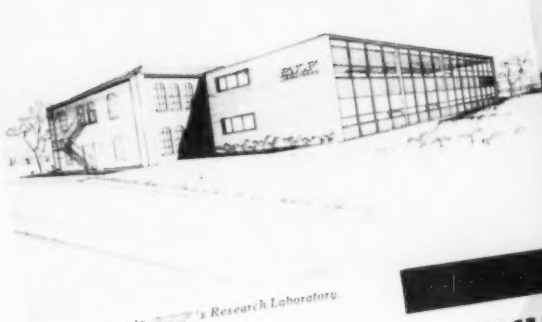
American further argues that now, with business demand good, is the easiest time to put through the discount elimination—rather than waiting until people are more cost-conscious.

American argues that the only possible legal question on the discount, as treated within the administration of the Interstate Commerce Commission, has been discrimination. Elimination of a uniform 5% discount doesn't raise that problem, says AA.

• **Dollar raise reasonable.** American as-


TOTAL OPERATING EXPENSE IN CENTS PER MILE
DOMESTIC TRUNKLINE CARRIERS
12 MONTH AVERAGES, BY QUARTERS, TO NOV. 30, 1951
CENTS PER MILE
12 MONTHS ENDED


TOTAL OPERATING EXPENSE AND OPERATING INCOME (LESS MAIL PAY)
AND TOTAL AVAILABLE TON-MILES
DOMESTIC TRUNKLINE CARRIERS
12 MONTH TOTALS, BY QUARTERS, TO NOV. 30, 1951
DOLLARS (MILLIONS)
12 MONTHS ENDED



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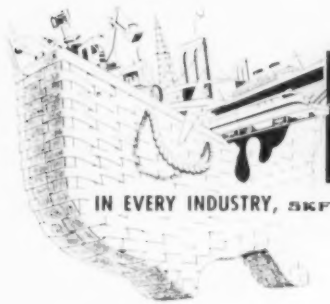

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serts that the long-standing uniform per-mile fare on air passenger transport has no economic justification; this has long been recognized in the surface transport field. Short hauls cost more per mile than long hauls. The proposed $1 increase on all tickets would make partial compensation for higher unit cost of shorthaul flights.

The four-engine plane has brought extraordinary reductions in longhaul costs, says American. "Consequently a fare structure which ignores the extra cost of the shorthaul has finally become obsolete."

One dollar more per ticket would have brought $3,294,000 more revenue last year, says American, assuming that price had no relation to demand.

• **Time running short.** It might have been better to have raised fares and eliminate the roundtrip discount a year ago, American says. "At a later time management might well be too apprehensive about traffic demand to initiate steps of this nature." AA says the value of a promotional roundtrip discount is nil, but apparently fears that other airlines would not agree in hard times.

• **Cost increases.** Then American cites rising costs. Selected wage increases 1952 over 1950—for American show pilots up 11-30%, mechanics up 16% and clerical personnel up 12%. Meanwhile, American's productivity per employe has risen from 17,654 ton-miles flown a year per man the first quarter of 1950 to a peak rate of 23,756 ton-miles the third quarter of 1951, and declined from there to an estimated 22,690 ton-miles a man for the coming quarter, April-June, 1952. The next quarter's personnel productivity will be 28% more than for the first quarter of 1950 but 4% under the productivity peak of last year's third quarter.

• **Can't boost load factor further.** With costs going up, only load factor improvement can make it up. But "the 1951 industry load factor of some 70% is far in excess of any load factors in save for the years 1942-46. . . ."

American says "normal load factors are in the 60-62% range." Industry average 1947-1950 was 61.4%. "Every percentage point of decline (from the present high loads) adds greatly to the impact of the cost increases."

Looking beyond 1952, American predicts that "it is not unlikely that this industry may have to find $750 million for new equipment in the course of the next decade." The average postwar rate of return of 4.5% on investment for the Big Four is "pitifully small" by comparison with potential capital requirements, AA concludes.

▶ **American**—At current fares, American Airlines forecasts a 1952 net income after taxes (but before interest of $900,000) at $7,781,000, yielding a 7.27% return on its investment of $107 million.

The $1 raise and elimination of roundtrip discounts would raise this to a profit of $10,066,000 or 9.3% return on investment, assuming the price increases have no bearing on demand. "After interest net income would be only $9,166,000."

"American's earnings even after pending fare adjustments would be lower than in either 1950 or 1951 in dollar amount and very substantially lower in relation to gross business actually transacted," the memo says.

• **Earnings.** American Airlines earnings estimate, first quarter 1952 compared with first quarter 1951:

Revenue, $38,837,000 and $33,924,000.

Expense, $37,321,000 and $26,520,000.

Net operating income, $1,516,000 and $7,404,000.

Non-operating ded. (net), $12,000 and $139,000.

Income before tax, $1,528,000 and $7,265,000.

Tax, $900,000 and $4,350,000.

Net after tax, $628,000 and $2,915,000.

"If this unfavorable trend continues, the forecasts we have made for 1952 will have to be drastically revised. . . ."

▶ **Eastern**—Eastern Air Lines estimates the fare increases would boost 1952 revenue by $3,793,032, assuming the same total traffic this year as last.

Like American, Eastern says "management should have full discretion to effectuate these slight fare adjustments." In justification of the increases as requested by CAB, Eastern presents some statistics. Eastern says that expenses have increased while revenues have decreased per passenger or per ton-mile —resulting in a pinch on operating income.

• **Operating income.** Eastern net operating income, listing income per revenue passenger-mile, per available seat-mile and per available ton-mile, in that order:

January-March 1951—1.64 cts., 1.09 cts. and 7.82 cts.

April-June 1951—.95 cts., .62 cts. and 4.5 cts.

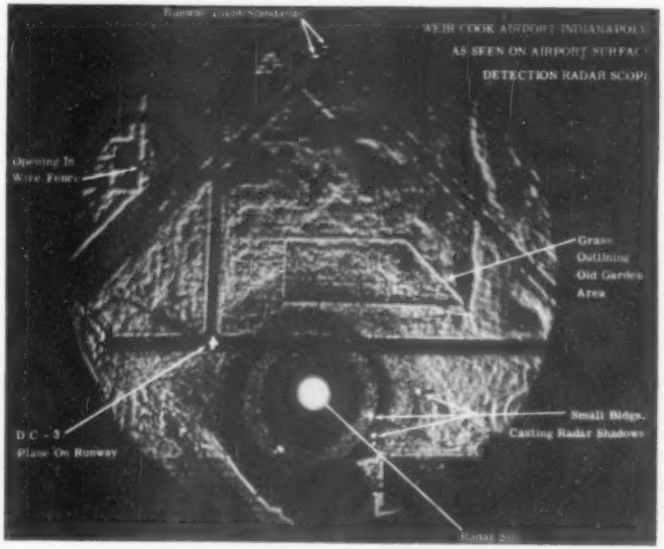
July-September 1951—.85 cts., .54 cts. and 3.94 cts.

October 1951—.81 cts., .53 cts. and 3.81 cts.

November 1951—.60 cts., .38 cts. and 2.71 cts.

(Source: EAL summary of Form 41 reports submitted to CAB.)

This cost pinch will continue in 1952. Selected expense increases over 1951 are reported as: Salaries and wages will increase $4.8 million; employe benefits $336,000; travel and incidentals $600,000; integration of new equip-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ASD RADAR HAS SHARP 'VISION'

Sharp definition of Airport Surface Detection Radar equipment being tested and evaluated by Air Navigation Development Board as a possible aid to traffic control during poor visibility is pointed up in this radarscope photo of Weir Cook Airport, Indianapolis. ASDR operates in the K Band, 25,000 mc., and as the picture shows, sharply defines even small objects. Aircraft appear not merely as "pips" but in outline. Technicians say the radar will define a man walking more than a mile away.

ment $1.5 million; depreciation of flight equipment $6,120,000; gasoline and gas tax $1,830,000; other materials and supplies $585,000.

In all, Eastern says 1952 expenses will go up at least $15,771,000, whereas even the proposed fare adjustments will bring in only an estimated $3,794,632. That leaves an $11,976,000 cost increase to be offset by selling more tickets this year than last and by lowering unit costs through increasing productivity.

Passenger revenue per mile will decrease this year because Eastern will cut air coach rate from 4½ cents to 4 cents a mile, effective Apr. 1 "in line with the Board's air coach policy."

• **Costs up.** United claims that materials cost rises range from 87% for propeller parts down to 5% for airframe parts. Fuel is up 11%, pilot salaries up 23%, other wages up 26%.

Depreciation expense interests are emphasized by UAL. Present plans call for delivery to the company of 24 Convairs and 12 DC-6Bs this year, with increased depreciation charges from 1951's $10.8 million to about $14.9 million in 1952.

Federal taxes are calculated by UAL at $11.3 million in 1952, compared with $10.7 last year.

• **Load factors down.** A 10% drop in the 1951 load factor would have cut revenues by $10,353,000 and a 5% jump in expenses would have raised costs $5,127,000, United says. That would have wiped out the company's $17.5-million operating profit for the year. United's large scale introduction of new equipment this year will reduce load factors and increase costs, the company says.

► **United**—A projection of January and February cost and revenue increases to cover 1952 would bring United net operating income of only $14,906,899 this year, compared with last year's $18,526,939. This means that operating profit margin would decline to 11% compared with 1951's 17%, before taking into account the increasing investment tied up in new equipment deliveries on the one hand and capital gains from sale of obsolete equipment on the other.

One-way United fares would increase 2.72% and roundtrip fares 8.12% on the 600-mi. Chicago-Washington route, which is a typical United service, it is estimated. (Average trip on United in 1951 was 643 mi.) Roundtrip would go from $69.90 to $75.60.

United cites rail fare increases since 1941: first class rail up 50% in the East to 4½ cents a mile, and West and South up 17% to 3¼ cents, compared with United's 10% fare increase since 1941 to the present 5½ cents a passenger-mile.

From the rail comparison, United concludes: "Gauged by their action, it would appear that the rail carriers have attempted to reconcile fares and costs. The airlines are similarly confronted with such necessity."

• **Warning.** United cites CAB Member Oswald Ryan's recent speech warning the industry of rising costs and the need to secure a 500% increase in patronage the next three years to maintain load factors as air transport fleets increase 50% also.

• **Offset coach fare cut.** "In the absence of the proposed increased fares, a downward trend in passenger yields can be expected to continue under the influence of expanded air coach service." Unit costs are rising, despite tight expense control, UAL adds.

• **Held prices down.** UAL says it has kept its fares "as low as sound economics permit."

► **CAB Staff Would Wait**—Here is the tentative position CAB rates experts took this month when first confronted with demands by the airlines for higher fares.

They made two major points opposing hasty price raises:

• **Short range.** In the 12 months ended Nov. 30 last year, domestic trunk lines' operating income averaged over 30% return on investment—probably at least a 15% return after taxes. An 8% return is traditionally considered fair and reasonable. Even though costs may rise, the airlines haven't proved yet that profits will go below 8% unless fares go up.

• **Long range.** Airline fleet capacity will increase about 60% the next three years. A 50% increase in air travel demand is needed to keep profitable load factors during expansion of capacity 1952-54. Raising fares is not the best way to go about increasing business volume 50% in three years.

A year ago, during the Big Four mail rate case, the carriers made the same claim that the industry was in for trouble with increasing costs. But over the last year expenses per available seat-mile declined, according to the CAB figures.

Here are airline returns on investment for the 12 months ended Nov. 30, as computed by the CAB staff from airline Form 41 reports. These are operating profits, before taxes and other deductions, but also computed by CAB on service mail rates—before any subsidies: American 34%; Eastern 43%; TWA 23%; United 33%; Braniff 32%; Capital 38%; Delta 47%; National 67%; Western 29%; and trunkline average 29%.

They earned about $98 million net operating income in the 12 months to Nov., 1951, compared with $30 million in 1950, none in 1949 and a loss of $28 million in 1948 and 1947.

Operating returns of 15-20% or net returns of 8% this year would be fair and reasonable, CAB's rate staff says. And by asking immediate fare raises to offset anticipated costs, the airlines are crying wolf too soon, it says. The government analysts want the airlines to risk a bad quarter in order to see if fares can be held down. They may earn a fair return next quarter without raising prices. This January-March quarter cannot be considered normal with the disastrous series of crashes at Elizabeth, N. J., and the closing of Newark Airport.

(The closing of Newark is costing Eastern $50,000 a day and American $100,000 a day in lost revenue alone, according to recent testimony by EAL President E. V. Rickenbacker before the House Aviation Subcommittee.)

The airlines' memos cite increased purchase costs on engines, propellers and components. But the service life of major components is being lengthened,

AIRLINE EXECUTIVES DISCUSS MERGERS

Top management of four U. S. air carriers got together to wish each other success and discuss current merger plans at a recent dinner sponsored by Mid-Continent Airlines in Minneapolis. Pictured, left to right, are: J. W. Miller, president and general manager of MCA; James Carmichael, president of Capital; Croil Hunter, president of Northwest; Thomas F. Ryan, III, chairman of the board of MCA; and Thomas E. Braniff, president and chairman of the board of Braniff Airways.

and this factor is cited to offset higher original purchase price.

CAB rate staff says: Let's wait a month or so more and see first if airline profits are destined to go down and stay down below 8% unless fares go up.

Board members were generally non-committal last week on this subject. They, like their staff, want to study all the evidence before deciding.

NAL DC-7s to Cost $2 Million Each

National Airlines is paying $2 million each for the four 68-passenger Douglas DC-7s ordered recently (AVIATION WEEK Mar. 10, p. 7).

The carrier is getting its first plane in October, 1952, the others to follow at one-month intervals. National says that its order, on top of eight DC-6Bs and 14 Convairs already ordered, will more than double its present fleet at a total cost of $30 million.

NAL President G. T. Baker says that the carrier will work out the financing of all this new equipment without much difficulty. One big reason for this optimism: NAL's profitable two-year experience with off-season packaged "piggy bank" vacations to Florida, which has spurred the carrier to greater efforts in promoting the idea this year. The scheme has enabled NAL to solve its seasonal traffic slump and show a profit every month.

Off-season vacationers are offered even bigger and more economical deals this year. For example: roundtrip coach flights from New York to Miami and a week's stay in one of 14 beach-front hotels for $108 (plus $12.90 tax)—$20 less than last year. The off-season tripper has a choice of 38 hotels if he wants to spend a little more.

Then there are side trips available to Havana, Nassau, Jamaica, Panama, San Juan, Puerto Rico and Mexico City. Including the roundtrip flight from New York and the basic Miami vacation, these will cost: Havana, 5 days, $156.50; Nassau, 5 days, $157.50; Jamaica, 7 days, $262; Panama, 9 days, $317.80; San Juan, 9 days, $253; and Mexico City, 9 days, $250.60.

That the "piggy bank" vacation scheme pays off can be gathered by looking at NAL's record. Following a deficit in the summer, 1949, the carrier had a $520,058 profit the next summer when it sold 3,231 packaged vacations at $120.55 each. Last summer, 4,835 "piggy bank" tours were booked by NAL, providing an off-season $745,765 profit. The outlook this year: two or three times as many buyers as last summer.

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SHORTLINES

► **Air Line Pilots Assn.** is asking CAA Administrator Charles Horne to ban deliberate three-engine takeoffs now permitted for ferrying stranded 4-engine planes back to maintenance bases. Airline alternative is to send a spare engine and maintenance crew by air or truck to the stranded plane.

► **Air France** plans to start a non-stop N. Y.-Mexico City service in late April as part of its new Paris-Mexico route. Survey flight recently set a record. Air France says, with 6 hr., 26 min. N. Y. to Mexico City with a Constellation.

► **British European Airways** must stop its London-Birmingham passenger helicopter service because the Transport Ministry has cut off its subsidy for the experimental service.

► **Capital Airlines** plans to start a non-stop N. Y.-Birmingham Constellation service May 1.

► **Canadian Air Transport Board** and CAB have trimmed red tape required for charter flights over U. S.-Alaska-Canada borders. General permits instead of individual ones are available, providing flights are infrequent and do not involve cabotage.

► **Civil Aeronautics Board,** acting on a petition for reconsideration, has included foreign passenger service in its "investigation of air service by large irregular carriers and irregular transport carriers."

► **Delta Air Lines'** final mail rate is set at 53 cents a mail ton mile by CAB, retroactive to last Oct. 1. CAB designates this rate as "compensatory" for mail service on Delta's routes—no subsidy.

► **Douglas Aircraft backlog** includes more than $200 million in civil transports.

► **Eastern Air Lines** is considering purchase of new DC-7s, offered by Douglas Aircraft for early delivery. N. Y.-Miami competitor National Airlines has bought four. The DC-7 is expected to be the fastest transport built in the pre-turbine-power transport era.

► **Helicopter Air Service** metropolitan Chicago copter line, will get about $133,638 additional mail pay for the period Aug. 20, 1949, to Sept. 30, 1951, assuming CAB finalizes final mail rates proposed in its show cause order to HAS. Final rate from Oct. 1, 1951, henceforth is set at $494,653 in the CAB order, estimated by CAB to yield net profit after taxes of $21,408. HAS owns six Bell 47D copters.

► **Hawaiian Airlines'** final mail pay for Oct. 25, 1949-June 30, 1951, is fixed at $113,594, or about $65,000 over what Hawaiian got under the temporary rate. Effective rate estimated by CAB from July 1, 1951, is 15.32 cents a mile, with base rate (maximum) of 31.55 cents.

► **Lake Central Airlines** will get $81,920 more temporary mail pay for the period Nov. 5, 1949, to Dec. 31, 1951, if CAB carries through its show-cause order. But this is $120,000 less than LCA said it needs. And the order sets future mail pay of $110,000 less than annual requirements estimated. CAB says the cuts are to guard against overpayment.

► **Mexico** and U. S. have cut some red tape for border crossings so pilots only notifies one agency (govt. communications agency) instead of three. Communications agency then does the rest —such as notifying immigration and health.

► **National Air Taxi Conference** sees metropolitan helicopter service as a major threat to air taxi business in the future, if CAB does not change one current air taxi regulation. CAB now prohibits air taxis from flying on any route operated by a certificated helicopter service.

► **National Aviation Trades Assn.** has acquired two more state aviation operator groups—Kansas and Texas. Galen Bertram, of Greensburg, heads the Kansas group; John Brownlee, of Alamo Aviation, is interim president of the Texas chapter.

► **Pan American World Airways** has Transport Workers Union agreement on a 2-year labor contract raising mechanics and ground service workers 10 to 16 cents an hour, retroactive to last Dec. 1, but with clause permitting reopening with 30 days' notice before next Feb. 28. Terms are based on recommendations from the Presidential Emergency Board made Dec. 17. . . . Company has shifted administration of N. Y.-based pilots flying N. Y.-Latin America from the Latin American division in Miami to Atlantic divison in N. Y. to make it easier to use the pilots on trans-Atlantic routes when needed.

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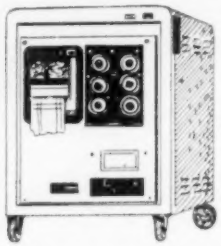

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132,000	AN525-8-6	196,000	AN525-10-14
538,000	AN525-8-8	114,000	AN525-10-16
345,000	AN525-8-10	252,000	AN525-416-10
1,019,000	AN525-10-8	536,000	AN525-416-12
401,000	AN525-10-10	192,000	AN525-416-14
678,000	AN525-10-12	210,000	AN525-416-16

PLUS MANY OTHERS

43 PIECES

ENGINE QUICK CHANGE UNITS APPLICABLE TO GRUMMAN FM-1 AIRCRAFT. COMPLETE WITH ACCESSORIES

MISCELLANEOUS COMPONENTS

Quantity	Part No.	Mfg.	Description
45	AN4103-2	Clifford	Brass (Valve #U4785) Oil Cooler
18	18597-2	Airsearch	Aluminum Oil Cooler
120	MF9-713-15A	Vickers	Hydraulic Pump
700	TFD-8600	Thompson	Fuel Booster Pump
125	D7818	Adel	Anti-icer Pump
50	2P771-A	Pesco	Fuel Booster Pump
250	AN4014	Erie Meter	Wobble (D-3) Pump
300	1H260-K & KA	Pesco	Hydraulic Pump
19	AN5531-1	G. E.	Tach. Generator
1000	AN5780-2	G. E.	Wheel & Flap Position Indicator
400	AN5780-2	Weston	Wheel & Flap Position Indicator
16	76B19	Lewis Eng.	Cyl. Head Temp. Gauge
10	46B2	Lewis Eng.	Air Temp. Ind.
11	47B21	Lewis Eng.	Temperature Ind.
12	47B22	Lewis Eng.	Temperature Ind.
20	47B23	Lewis Eng.	Temperature Ind.
36	47B24	Lewis Eng.	Temperature Ind.
10	76Z2	Lewis Eng.	Air Temp. Ind.
11	76B4	Lewis Eng.	Temperature Ind.
20	77C4	Lewis Eng.	Temperature Ind.
21	77C5	Lewis Eng.	Temperature Ind.
85	7971Y72Z2	Weston	Left Wing Anti-icing
88	7971Y73Z2	Weston	Right Wing Anti-icing
83	7971Y74Z2	Weston	Tail Anti-icing
11	9227-11D-3A	Eclipse	Dual Tachometer
44	5BA25DJ4B	G. E.	DC Motor (1/3 HP)
83	A4934	Delco	Motor
50	RD82220	Holtzer Cabot	DC Motor
115	P4CA2A	Parker	Primer
70	AN3213-1	Scintilla	Ignition Switch
450	A-9 (94-32226)	Nasco	Ignition Switch
687	RS-9	Mallory	Selector Box
90	JH950-R	Jack & Heintz	Starter Motor
492	S-841 (94-32253)	Electronic Labs	Box
53	AN6203-3	Bendix	Accumulator 10"-1500 P.S.I.
1000	13018-A	Bendix	Interphone Box
140	K14949E	Marquette	Windshield Wiper Kit
188	EYLC-2334	Barber-Colman	Control
11	12086-1C	Eclipse	Amplifier
174	450-0	Skinner	Gasoline Filter
250	558-1A	Eclipse	Oil Separator
100	716-3A	Eclipse	Generator (NEA-3A)
37	117-47	Edison	Detector
89	318	Edwards	Horn
20	794-F	Stewart-Warner	Heater
230	921-B	Stewart-Warner	Heater (200000 BTU)
340	981280	Kidde	Co2 Cylinder
85	12924-2	Adel	Lock Valve
90	923748	Kidde	Oxygen Cylinder
80	DW28	Eclipse	Transformer
97	6041H-146A	Cutler-Hammer	Relay (B-12)
22	0655-D	Airo	Oxygen Regulator
148	PG208A51	Minn. Honeywell	Air Ramp Switch
33	DW47	Eclipse	Transformer
11	DW33	Eclipse	Transformer
65	ASDC2	CO2 Mfg. Co.	Fire Detector
600	ND21	American Gas Accumulator Co.	Time Delay Relay
30	U6005-DV5	United Air Prod.	Oil Temp. Reg. 5"
29	UA-3160	United Air Prod.	Oil Temp. Reg. 6"
95	UA-3160C	United Air Prod.	Oil Temp. Reg. 6"
73	UA-6007-CF-DV5	United Air Prod.	Oil Temp. Reg. 7"
14	UA-6009-S-30	United Air Prod.	Oil Temp. Reg. 9"
11	UA-6012K-S30K	United Air Prod.	Oil Temp. Reg. 12"

CARBURETORS! MAGNETOS! SPARK PLUGS!

Quantity	Part No.	Description
247	PD12K10	Stromberg injection Carburetor
19	1375F	Holley carburetor
407	SF9LN-2 (manufacturer's part No. 10-12451-6 Spec. AN9511)	Bendix Scintilla Magneto
42	SF5RN-12 (manufacturer's part No. 10-26170-1)	Bendix Scintilla Magneto
185,000	LS4AD1	Spark Plug (Aero)
30,000	LS-6S9A	Bendix Scintilla Spark Plug

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Quantity	Part No.	Description
328	PD12K10	Stromberg injection carburetor
236	PR48-A1	Strombergs carburetor
29	PR48-A2	Strombergs carburetor
31	PR48-A3	Strombergs carburetor

PRATT AND WHITNEY AIRCRAFT ENGINE PARTS

Quantity	Part No.	Description
166	1045A	Bearing
500	3506	Flange
130	8288	Follower Ass'y
814	35B14	Blower Ass'y
53	48362	Shaft
175	48363	Shaft
56	48392	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
113	84487	Housing
77	845915C	Nose Housing
200	48350-D	Crankcase Ass'y
200	84083	Cylinder
100	84084	Cylinder
200	84085	Cylinder

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Quantity	Part No.
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8600	K3L-R48
4000	KF4
3000	KF4H
30000	KP4B16-2
3300	KSF5
17000	BC5W11
28000	KS6A
7000	38KD4
6600	RE3MR3
5000	F35-14

ACTUATORS

Quantity	Part No.
42	400AJ3
161	420 EC
160	420 DY
12	M-2031 (Air Associates)

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Aviation Week, 3-31-52

U. S. Air Forces

Name	Command	Location and Commander
First	ConAC	Mitchel AFB, N. Y. CG—Maj. Gen. Howard M. Turner (TDY FEAF)
Second	SAC	Barksdale AFB, La. CG—Maj. Gen. Joseph H. Atkinson
Third	USAFE	England CG—Maj. Gen. Leon W. Johnson
Fourth	ConAC	Hamilton AFB, Calif. CG—Maj. Gen. William E. Hall
Fifth	FEAF	Seoul Airdrome, Korea CG—Lt. Gen. Frank F. Everest
Eighth	SAC	Carswell AFB, Tex. CG—Maj. Gen. Samuel E. Anderson
Ninth	TAC	Pope AFB, N. Car. CG—Maj. Gen. Edward J. Timberlake
Tenth	ConAC	Selfridge AFB, Mich. CG—Maj. Gen. Harry A. Johnson
Twelfth	USAFE	Wiesbaden, Germany CG—Maj. Gen. Dean C. Strother
Thirteenth	FEAF	Clark AFB, Philippine Islands CG—Brig. Gen. Ernest Moore
Fourteenth	ConAC	Robins AFB, Ga. CG—Maj. Gen. Charles E. Thomas, Jr.
Fifteenth	SAC	March AFB, Calif. CG—Maj. Gen. Emmett O'Donnell, Jr.
Eighteenth	TAC	Donaldson AFB, S. C. CG—Maj. Gen. Robert W. Douglass, Jr.
Twentieth	FEAF	Kadena AB, Ryukyu Islands CG—Maj. Gen. Ralph F. Stearley
Central Air Defense Force	ADC	Kansas City, Mo. CG—Maj. Gen. George R. Acheson
Eastern Air Defense Force	ADC	Stewart AFB, N. Y. CG—Maj. Gen. Frederick H. Smith
Western Air Defense Force	ADC	Hamilton AFB, Calif. CG—Maj. Gen. Walter E. Todd
Flying Training	ATRC	Waco, Tex. CG—Maj. Gen. Warren R. Carter
Technical Training	ATRC	Gulfport, Miss. CG—Maj. Gen. Eugene L. Eubank
Aviation Engineers		Wolters AFB, Tex. CG—Colonel Herbert W. Ehrgott

SOURCE: USAF.

Aviation Week, 3-31-52

Naval Aviation Personnel

Year[1]	Officers[2]	Enlisted[2]	Civilian
1945	76,864	240,303	94,569
1946	30,033	76,854	86,798
1947	12,679	37,802	79,359
1948	11,195	38,195	74,886
1949	13,217	65,793	80,152
1950	16,709	59,072	66,339
1951	16,883	109,401	81,520

[1] As of June 30 annually.
[2] Includes flying and non-flying officers.
[3] Includes Naval aviation pilots and aviation rates.

SOURCE: U. S. Navy.

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USAF Personnel

Year[1]	Officers	Enlisted	Civilian
1945	381,454	1,900,805	393,896[2]
1946	81,733	373,782	196,709[2]
1947	42,745	263,082	110,067[2]
1948	48,957	337,435	121,103[2]
1949	57,851	361,496	168,958[2]
1950	57,006	354,271	154,453[2]
1951[3]	98,718	681,282	260,728[2]

[1] As of June 30 annually.
[2] Estimated.
[3] Zone of Interior only. All overseas civilian employes listed under Army.
[4] Zone of Interior and overseas.

SOURCE: USAF.

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EDITORIAL

Horne Denies CAA Smuggling

I HAVE HAD A THOROUGH INVESTIGATION MADE BY A COMMITTEE HEADED BY MY DEPUTY ADMINISTRATOR OF THE CHARGES OF SMUGGLING BY CAA AGENTS AND OTHER CHARGES MADE IN THE NEW YORK JOURNAL-AMERICAN AND REPEATED IN YOUR MAGAZINE. EVIDENCE ON HAND PROVES THESE CHARGES ARE ERRONEOUS. CAA ALWAYS HAS CONDUCTED A CLEAN OPERATION, AND I INTEND TO KEEP IT THAT WAY. ANY CAA AGENT WHO ENGAGES IN IMPROPER ACTIVITIES WILL BE DISCHARGED BUT I WILL STAND BEHIND ANY OF OUR PEOPLE WHO ARE FALSELY ACCUSED. I REGRET THAT YOU DID NOT SEE FIT TO SEEK THE FACTS IN THIS MATTER FROM THE CAA. WE ARE ALWAYS READY TO COOPERATE IN PROVIDING INFORMATION.

CHARLES F. HORNE
ADMINISTRATOR OF CIVIL AERONAUTICS
MARCH 19, 1952

Aviation Week's Reply

THANK YOU FOR YOUR TELEGRAM. WE ALWAYS KEEP OUR COLUMNS OPEN FOR THE OTHER SIDE OF EVERY QUESTION. WE WILL PRINT YOUR WIRE IN ISSUE OF MARCH 31ST, NEXT ISSUE THAT IS OPEN. MAY I HAVE COMPLETE REPORT OF YOUR COMMITTEE, NAMES OF COMMITTEE MEMBERS, AND ALL OTHER RELEVANT MATERIAL SENT TO ME IN NEW YORK. ALSO APPRECIATE YOUR EXPRESSED WILLINGNESS TO COOPERATE IN PROVIDING INFORMATION. WE WILL SUBMIT TO YOU A NUMBER OF QUESTIONS WE WOULD APPRECIATE YOUR ANSWERING. UP TO TIME WE REPRINTED JOURNAL-AMERICAN SMUGGLING STORY (MARCH 17) THEY HAD RECEIVED NO DENIAL OR CORRECTION FROM YOU OR CAA ON ITS ACCURACY. THIS WAS STILL THE CASE UP TO YESTERDAY AFTERNOON. THEREFORE, WE HAD NO REASON TO DOUBT STORY'S AUTHENTICITY, SINCE THEIR STORY RAN AS LONG AGO AS FEB. 12TH. DID YOU DENY THEIR STORY EARLIER THAN YOUR TELEGRAM TO ME YESTERDAY, MARCH 19? UNDERSTAND CAA IS RESTRICTING CIRCULATION OF ALL CAA COPIES OF AVIATION WEEK TO YOUR LIBRARY, AND THAT YOU ARE REQUIRING YOUR PEOPLE TO SIGN FOR EACH INSPECTION OF EACH COPY. IS THIS TRUE?

ROBERT H. WOOD
MARCH 20, 1952

Letter From Admiral Horne

Dear Mr. Wood:

I am indeed happy to hear that you always keep your columns "open for the other side of every question." As my office staff knows, I have made repeated—but unsuccessful—telephone calls to reach you through both your New York and Washington offices in order to invite you to get the facts about the Aviation Safety reorganization. As far as I can determine, you made no attempt to obtain facts from responsible CAA officials prior to publication of your editorials of March 3, 10 and 17.

Since your columns thus far have been devoted exclusively to "the other side" of the question, I think it only reasonable to suggest that you allow us to state our side in our own manner and at the same length, rather than expect us only to reply to specific questions framed by you. I, therefore, suggest that in your next issue you print the letter being sent to you today by Messrs. Hensley and Davis. This letter represents their reply to the personal accusations made against them, but it has my full approval as an expression of the policy which CAA has pursued in its reorganization of the Office of Aviation Safety.

With the printing of the Hensley-Davis letter and my telegram, I intend to consider the matter closed, so that CAA can get on with constructive work in its basic job of helping to keep civil aviation operating safely and successfully and advancing civil aviation wherever possible.

The investigation of the smuggling charges was conducted for me in order that I could determine whether the situation called for disciplinary action or any internal management steps. Having satisfied myself that no disciplinary action is warranted and that no employes of CAA have been guilty of malfeasance, I do not consider it appropriate for the "case" to be tried in the press.

The proper authorities outside of CAA have had opportunity to initiate legal action, if such action were called for. If you have any additional information, or if you have any reason to believe that legal action is called for, I would suggest that you present such information to the appropriate authorities, as any good citizen would in such a case.

With regard to your "understanding" that CAA is restricting circulation of all copies of Aviation Week to its library, and requiring our people to sign for each inspection of each copy, here are the facts:

Whenever a large volume of demand develops for a particular issue of a periodical, it is standard practice for our library to reserve at least one copy for use in the library, or for brief loan by special request in order that the maximum number of people may read the periodical. This policy has been applied to directory issues of your publication, for example, and was applied to the March 3 issue of American Aviation which contained a favorable presentation of the Aviation Safety reorganization. Precisely the same procedure was followed with the March 10 and March 17 issues of Aviation Week, since they contained material of obvious interest to many CAA people. We have encouraged and will continue to encourage all of our CAA people to read all aviation trade publications without restrictions of any kind, real or implied.

Normally our library routes three copies of Aviation Week to a list of CAA personnel. This was done with the March 3 issue, but so many extra demands were received for this issue that with the issues of the 10th and 17th, only one copy was routed and two were reserved for reference or brief loan. Persons who came into the library to look at the magazine were not requested to sign. No record was kept of who asked for any publication or who read it. The copies which went out on special loan were recorded, in accordance with standard procedure of the library, for the obvious reason that if the library didn't, it would be impossible to recall them to meet other requests.

Although I feel you have treated CAA and its people unfairly, I have no desire to engage in any recriminations, hence I leave it entirely to your judgment whether you print this letter or not. I feel that Aviation Week has done much constructive work for civil aviation in the past, and I hope that we can cooperate in the future for what I am sure is our mutual purpose—advancement of civil aviation.

C. F. HORNE
Administrator of Civil Aeronautics
March 21, 1952

(In the interest of complete understanding on both sides, we expect to keep communications on a written basis between Messrs. Horne, Hensley and Davis, and ourselves. Some of the important CAA persons who have given us information will be surprised to read Admiral Horne's implication that they are not "responsible." The first question we asked CAA's information chief—about the cost of this reorganization was and still remains unanswered. We open our pages at any time to "the other side." There is nothing new about this policy. Admiral Horne may consider the matter closed if he wishes, and he probably will. But we don't. We hope to help him, if possible, in the constructive and desperately important basic job of helping civil aviation. The admiral may be satisfied to whitewash the smuggling charges. We are not. Why is he unwilling to tell the membership of the committee and to make its complete report public? On the report to us that AVIATION WEEK *distribution was being restricted, we are satisfied with the admiral's reply. It should be noticed that we did not publish this reference until we had an answer.—R.H.W.)*

A Letter From Hensley & Davis

Dear Mr. Wood:

We have read the editorials concerning the recent reorganization of the Office of Aviation Safety, Civil Aeronautics Administration, which you, as editor of the magazine Aviation Week, a McGraw-Hill publication, had printed and given widespread circulation in the Feb. 11, March 3, March 10, and March 17, 1952 issues of that periodical.

Under an American tradition of a free press, it is your privilege to have and express your own opinion on such matters. We do not believe, however, that you are entitled to make serious charges by name against our personal and professional character, integrity and honesty, unless you have facts to back them up.

The alleged facts which you cite, by inference, by innuendo, by distortion, and by quoted untruths, have presented a completely erroneous report to the readers of this magazine.

It is surprising, and we think significant, that at no time prior to publication of these editorials did you make any attempt to secure the facts from the Office of the Administrator of Civil Aeronautics, the CAA Office of Aviation Information, or the Office of the Director of Aviation Safety. Other magazine and news service reporters and representatives did visit one or more of these sources to obtain complete information for their factual news stories on the same subject. We have no quarrel with you taking a position in opposition to the reorganization, but we very definitely take exception to your publishing such a position without even doing us the courtesy of following the usual practices of good journalism in attempting to ascertain all of the facts in the matter.

We consider that your editorials are so distorted with misinformation and untruth that they afford grounds for action to protect our personal and professional character. We also consider that this type of irresponsible journalism constitutes a deplorable disservice to aviation as a whole.

For these reasons, we consider it necessary and appropriate to request you to print in the next issue of Aviation Week this letter in its entirety, with no deletions or changes, giving it the same prominence as your aforementioned editorials.

Here are the facts.

As part of the CAA program designed to comply with the President's order calling for definite management improvement measures in Government, the Administrator on Apr. 13, 1951, transmitted to all offices of the CAA, both in Washington and the regions, a complete plan for the reorganization of the Office of Aviation Safety.

In this letter of transmittal, the Administrator asked for, and subsequently received, constructive suggestions for improvement of the plan.

A large majority of these suggestions were incorporated in the final draft, so that on Oct. 3, 1951, the Administrator directed a letter to all individual Aviation Safety personnel, notifying them of certain planned changes in the organization structure and responsibilities and outlining some of the reasons for making such changes.

In his letter, the Administrator stated that the ". . . new organization of Aviation Safety is aimed at increasing our efficiency and effectiveness and at better discharging our responsibilities to industry and the public."

He also stated ". . . We are now prepared, after discussions with the Regional Administrators and with the Office of Aviation Safety, to establish an Aviation Safety organization in the regions and in the Washington Office that will help us achieve the following objectives:

1. Improve service to the public by directing the efforts of specific organizational units and personnel toward the separate problems of air carrier safety and non-air carrier safety.

2. Utilize our personnel resources to better advantage by broadening the experience and expanding the scope and duties of individual responsibilities.

3. Improve the important and essential management functions of our work by a realistic and practical management improvement program in the areas of planning, programming, evaluation of performance and supervision."

The Administrator further stated that he had requested the Director of Aviation Safety ". . . to work with the Personnel Officer in completing arrangements for implementing these organizational changes, including procedures for screening and selection of appropriate personnel."

In accordance with these instructions, and working with the Personnel Officer, the Director of Aviation Safety sought, and received, advice from experts in the field of personnel selection and management with regard to screening, examining, and selection of personnel who would best be fitted to assume the management and leadership responsibilities, particularly of the 29 positions in the top-level structure of the Aviation Safety organization. Of these 29 positions, eight are located in the Washington office and

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EDITORIAL

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three in each of the seven domestic regions. The incumbents of these positions are given the responsibility and authority for planning and implementing the day-to-day work program in all areas of Aviation Safety.

On October 11, 1951, the Director of Aviation Safety transmitted a letter to all individual Aviation Safety personnel which, among other things, described the selection process which had been decided upon. This consisted of four steps, or parts:

1. Each employee concerned to submit a Standard Government Form 57 outlining his experience, education and seniority factors, for integration with his past performance ratings and promotional aptitude reports submitted by his superiors—all to be scored by the National Promotion Plan formula in effect for the past several years.

2. A group interview for the purpose of assessing personal and leadership characteristics in a group situation.

3. An individual interview to further measure personal characteristics.

4. A written test, of the multiple-choice type, dealing with administrative judgment.

In this letter, the director requested Aviation Safety personnel of grade GS-13 and above to participate in the examining process and, as a result, a total of 310 employees were evaluated during the process, which began on October 29, 1951, and was completed January 11, 1952.

After each person was interviewed, the results of his participation were recorded after agreement by all three members of the examining panel and forwarded by mail to the Personnel Officer of the Civil Aeronautics Administration in Washington. Upon completion of all interviews, the Personnel Officer then had compiled a final composite numerical score for each individual, and assembled registers, listing in numerical rating order all the candidates who met the technical qualifications which had been established for each separate position. The technical qualifications and job descriptions for each position were established in conformity with standard procedures as required by the Civil Service Commission, the Department of Commerce, and the CAA; and assured that each person whose name appeared on the register was competent from a technical, professional and experience standpoint, for that particular position. A copy of these standards was mailed to all personnel prior to the start of the screening process.

The Deputy Administrator of Civil Aeronautics, the Personnel Officer, and the Director of Aviation Safety, after detailed consideration, determined that the selection procedure policy would be to select, from the upper 25% of the registers established for those positions, the Washington division and branch chiefs and the regional division chiefs; and to select the regional branch chiefs from the upper 50% of the registers established for those positions. It was also decided at the same time that the selections would be made by a group made up of all of the seven domestic regional administrators, the Deputy Administrator of Civil Aeronautics, and the Director and Deputy Director of the Office of Aviation Safety. This group met in Washington on January 27-29, 1952, for the purpose of selecting individuals for each of the aforementioned positions.

Also, as a part of the revised structure, in each of the seven domestic regions there were four section chief positions to be filled. Because incumbents of these positions are primarily responsible for TECHNICAL decisions on a day-to-day basis, it was felt that requirement of high standards of executive and supervisory qualification was not so essential as in the upper echelon positions. Therefore, regional administrators were granted the latitude of selecting any name from the appropriate registers.

From this you should see that one salient point of this reorganization which has not been brought out in your editorials is the fact that the changes in organization structure pertained only to the Washington and regional headquarters offices, and had no effect on the regional district office structure, except to insure that those in the district offices who met the technical qualifications for any of the above positions to be filled received the same consideration for selection as everyone else.

In your various editorials you have referred on several occasions to ". . . this latest reshuffling of men around the country . . .", which gives the erroneous impression to readers that there was a widespread disruption of many people in many jobs. Actually, only 62 positions were affected of the slightly more than 1,000 technical positions and 700 administrative and clerical positions throughout the Office of Aviation Safety. To select the best qualified people for these 62 positions, only 16 people were involved in a physical change of station location. There were three assignments at lower grades and changes in stations. These three changes in station are included in the above figure. Others, of course, were promoted in grade or responsibilities or reassigned, but at their same regional or Washington station.

This screening process was a program, carefully planned, to evaluate individuals in order to enable us to find the best combination of technical experience and performance, coupled with managerial, leadership and supervisory qualities; to make the Washington and field organizations the same; and to simplify relations between the CAA and the industry. Your failure to ascertain these facts has cast a shadow over the honesty, integrity and personal character of personnel in the Office of Aviation Safety. We consider that you have done a great wrong to these men, to us, and to aviation.

In his letter of October 11, 1951, mentioned above, to all Aviation Safety personnel, the Director of Aviation Safety closed with this thought:

"I realize that the success of any organizational arrangement depends upon the understanding and will of the people involved to make it work. I believe this realignment of responsibilities will assist you in performing better your share of the overall job. The responsibility of improving safety in aviation is a big one, an important one, and a serious one. We cannot hope to accomplish it properly unless we work together in a spirit of cooperation and with a determination on the part of every one of us to give our best efforts to the job at hand, whatever it might be.

"Safety is no accident—it must be planned."

E. S. HENSLEY, Director
Office of Aviation Safety
WILLIAM B. DAVIS, Deputy Director
Office of Aviation Safety
March 21, 1952

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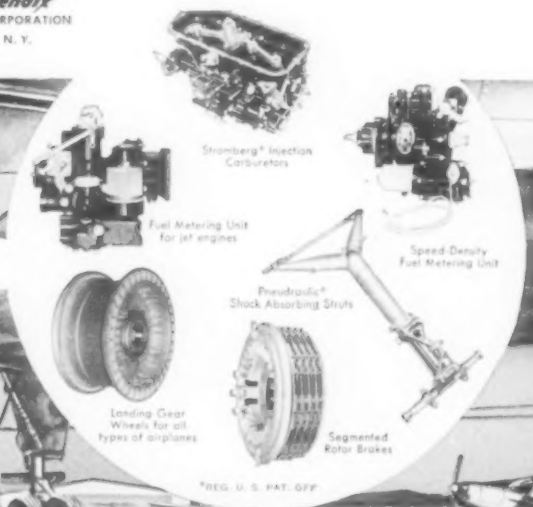
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